Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by

BENJAMIN LINCOLN ROBINSON, Editor-in-chief.

FRANK SHIPLEY COLLINS
MERRITT LYNDON FERNALD
HOLLIS WEBSTER
} Associate Editors.

WILLIAM PENN RICH
EDWARD LOTHROP RAND
} Publication Committee.

VOLUME 4,

1902.

Boston, Mass.
740 Exchange Building.

Providence, R. I.
Preston and Rounds Co.

W.829

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 January, 1902 No. 37

THE OCCURRENCE OF ELEOCHARIS DIANDRA AT BRUNSWICK, MAINE.

CHARLES A. DAVIS.

In the latter part of July and early August, in 1894, the writer was studying the flora of the vicinity of Brunswick, Maine. Nearly ten years before, while he was a student at Bowdoin College the same region had been, as was thought at the time, very thoroughly studied, but the knowledge and experience gained in the intervening time pointed out that many places of interest existed, which not only had not been examined, but had been avoided as barren, by the student.

The richest and most profitable collecting ground found at this time proved to be one of these supposed barren areas, namely the banks of the Androscoggin River, between high and low water marks.

Those familiar with the coastal region of Maine, know that many of the larger rivers are affected by the tides, for long distances from their mouths, the effects being well marked, up as far as the first fall above the mouth of the stream. This effect is of course not peculiar to Maine Rivers, but because of the fiord-like bays into which the rivers empty and the large volumes of fresh water which they discharge, this tidal action in Maine is frequently limited to mere holding back of the outgoing fresh water of the stream, so that twice a day, at high water, the river is broad and deep, and twice a day it becomes shallow and shrinks away from its former limits leaving bare much of its former bed. Since the effect of tidal action is to hold back the fresh water of the stream, we find that in the higher reaches of the tidal action, the water is fresh, and so we have rather broad zones of very wet fresh-water mud- or sand-banks, left along the

shores of the streams. These in their characteristics of soil and drainage are like marshes, but they lack the vegetable debris and stagnation which are found in marshes. They are, in fact, much more like wave-washed beaches in small and shallow lakes in their soil forms, differing from them mainly in the fact that they are less exposed to wind action, and have much more fine material deposited in places where slack water occurs. Small shallow pools are left by the retreat of the tides; mud- and sand-bars are abundant, and those which are exposed longest to the light and air, in summer and autumn, are covered with a rich growth of small plants. These, unless examined carefully, would seem unworthy of attention because of their insignificant size, and also because they are more or less covered by the fine silt brought in by the ever recurring tides. The botanist who is looking for unusual and rare species, will however not leave such areas without careful study, and as the Androscoggin River at Brunswick has all of the features described, many hours were spent in the study of the sand- and mud-bank floras of its shores and many interesting plants were found. Most interesting of all was the finding of the little *Eleocharis diandra* Charles Wright. This plant heretofore has not been reported from east of the Connecticut valley, and yet at Brunswick it was evidently at home in the muddy sand of the high water areas of a small cove in the shore of the river. Near it in a shallow pool, growing with *Juncus filiformis* L. and one or two small species of *Sagittaria*, was *Utricularia minor* L., until then an unnoticed plant in Maine, and two well marked forms of *Isoetes*, probably forms of *I. echinospora* Durien. The *Isoetes* were common even as far out as the borders of the deep channel of the stream. A more complete study of such tracts, and of these same ones at different seasons, would undoubtedly yield a rich harvest of obscure and rare species, for plants of this type of habitat are often very local in distribution but where they do occur they are found in abundance.

UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.

THE ELUSIVE CHARACTER OF POGONIA PENDULA. — As supplementary to the article on this somewhat transitory plant in RHODORA, ii, 211, a report from Vermont may be of interest.

Mr. Clifton D. Howe wrote from Burlington on Sept. 12, 1899: "Until three years ago *Pogonia pendula* had not been reported in this

state for fifty years, when it was found in Newfane. Since then it has been reported in several other places, but is still very rare. It was found quite plentiful in Newfane three years ago. Last year there were only a few plants, and this summer I have been unable to find one. I wish you would watch your station and see if you have the same experience with it." The observers at this station were Mr. Howe and Dr. A. J. Grout, whose homes were in that town.

Aug. 16, 1899, the day following that on which Mr. Harvey found it in Maine, the writer found a single plant in a rotten stump in Westminster, about ten miles east of Newfane. On Aug. 24 and on subsequent days, I found it quite abundant in a small wood-lot in Putney, less than a quarter of a mile from the first station. It grew in little hollows, the white, oblong tubers being in rotten wood or decayed leaves. Enough plants were found to have furnished specimens for all the botanists in New England, but of the few saved, most were thrown away, as they did not dry well, and it was planned to make careful collections the next year. Last year, however, and this, vain search has been made for this plant in the hollows where it was so plenty in 1899.

Reports from other stations are desirable. Does it thus disappear wherever found? Has any one ever carefully studied it? It seems to need very careful marking if it appears but once in a generation or two of "mortal men." Let those who find it spread the good news and make the most of their discoveries. It seems to be a case of "now or never." Efforts at artificial propagation might be successful in the hands of those who are skillful in the handling of bulbs. — W. H. Blanchard, Westminster, Vermont.

VOLVARIA VOLVACEA IN LAWRENCE, MASSACHUSETTS.

Francis H. Silsbee.

On August 5, 1901, a friend brought to me some specimens of fungi which were readily identified from the conspicuous volva, pinkish or salmon-colored gills, and absence of collar, as belonging to the genus Volvaria. A visit to the place where they were found revealed a large bed of them. In a dumping ground belonging to the Pacific Mills, Lawrence, a large amount of soiled cop and roving

waste, together with bits of rags and paper, more or less mixed with night soil, occupied a space of about one hundred square feet. The pile was perhaps two feet deep. This heap was almost covered with the fruit, which grew in great luxuriance in clusters of from three to five each, the groups being perhaps a foot or so apart. As they grew on such a loose, soft material it was very easy to secure specimens in all stages of development, from the closed volva up to the fully mature fruit. I did not notice any specimens where the cap was fully expanded so as to be really plane. While still somewhat conical, or broadly umbonate, the pilei would become wrinkled or crépy, and have a wilted appearance. On consulting Stevenson's British Hymenomycetes, I found that the species was undoubtedly *V. volvacea*. His description, which is that of Fries with dimensions added, is as follows: —

"Pileus 7.5 cent. (3 in.) broad, rarely more, cinereous, black-streaked with appressed fibrils, campanulate, then expanded, obtuse. Stem 7.5–12.5 cent. (3–5 in.) long, 12 mm. ($\frac{1}{2}$ in.) thick, white, solid, somewhat equal; volva lax. Gills free, flesh-colored. In stoves [hot-houses], roadsides, etc. Rare. July–Aug."

From careful observation of the bed referred to, this description might be amplified thus: —

"Pileus 3–6 in. broad; (very few were less than 3 in. and many were 5 or 6 in.); when first emerging from the volva almost black, and under a lens somewhat fibrillose-tomentose. As the pileus expands it becomes paler, and streaked with black, appressed fibrils, though the disk remains dark. The older pilei become broadly umbonate and striated, and in some cases almost sulcate, especially on the margin. There seemed, also, a general tendency for the pileus, even before expanding, to split at the disc, usually into quite regular quarters, the split often extending partly down the stem. The margin in the expanded caps, also, was frequently split. Stem silky-fibrillose, solid, white without and within, expanded into a bulb at base, and connected with the volva, central but frequently curved, probably owing to the irregular shape of the heap of material. When growing out of the side of a little mound, the stem would curve upward, to bring the pilei horizontal. Gills free, white at first, becoming pink or flesh-colored, and finally almost salmon-colored; rather close, of various lengths. Flesh white, rather thin; taste mild and rather pleasant, although the fruit all had a strong odor. Volva white below,

blackish brown above, rupturing quite regularly along a middle zone the upper half adhering to pileus, but breaking up into two or three large pieces as the cap expands, and soon falling off. The lower part of the volva remains large and loose, with a very free margin, though somewhat appressed. Volva white within.

The growth of these fungi was much affected by weather. After a rain they would develop from the button stage to maturity in about two days. Dry, hot weather with bright sunshine seemed to retard the rapidity and luxuriance of growth, specimens then also being smaller. The bed on which they grew was quite warm slightly below the surface, showing that rapid decay of the mass was taking place.

The spores were smooth, oval, somewhat pointed at one end, and about 8 to 9 × 5 to 6 μ, (6 to 8 × 3½ to 4, Massee). When collected in a mass on paper they were of a rusty salmon color.

At this writing, Aug. 18th, the bed is still bearing.

LAWRENCE, MASS.

REMARKS ON VOLVARIA.

HOLLIS WEBSTER.

MR. Silsbee's observations on *Volvaria volvacea* furnish a peg on which to hang a few notes about the genus, which may be acceptable to readers who have gone no farther in the study of toadstools than to safeguard themselves by learning the characteristics of the poisonous Amanitas. For a Volvaria is much like an Amanita, and would surely be classed as one by a tyro in whose mind the image of the wrapper or volva has temporarily obscured such things as veils and rings, or the color of spores. Indeed the volva is more conspicuous in Volvaria, as a rule, than in any Amanita except *A. caesarea*, in which, as in the larger Volvarias, it consists of a large, fleshy bag that can not possibly escape notice. From the prominence of this wrapper the genus takes its appropriate name. Unlike Amanita, Volvaria has no partial veil, and hence no ring on the stem. In this, Volvaria is like Amanitopsis. But whereas both the ringed Amanita and the ringless Amanitopsis produce white spores, Volvaria spores are pink or flesh-colored. The same tint is usually to be seen in the gills,

if they are not too young. Amanitopsis and Volvaria, then, differ from Amanita in having no partial veil, and from each other in color of gills and spores. As in Amanita, the gills in Volvaria are usually free, and the stem is easily separable from the cap.

Neither in number of species nor in frequency of occurrence does Volvaria equal Amanita. Hennings, in Engler and Prantl (Die Natürlichen Pflanzenfamilien, 1898) gives the number of described species as follows: — Amanita, 56; Amanitopsis, 28; Volvaria, 36. And Lloyd (Volvae of the United States, 1898) mentions, as ascribed to this country, of Amanita, 28 species; of Amanitopsis, 10; and of Volvaria, 12.

With other pink-spored Agarics, the genus Volvaria has been traditionally regarded by mycophagists with suspicion. Recent writers, on the contrary, have placed several species in the list of edible kinds. But opportunities for experiment are so infrequent, or so local, that most mycophagists will probably remain doubters, and prefer to err on the safe side.

Besides the species observed by Mr. Silsbee, two others may be mentioned. The first is perhaps as beautiful and striking an agaric as the woods produce. *Volvaria bombycina*, a species reported from Europe, Asia, North Africa, and North and South America, is the most widely known. It is found on fallen and on living trees, of various species, often in New England on the sugar maple. Though widely distributed, it is nowhere common. It is pure white, covered on the cap with glistening, silk-like fibrils (whence the name), grows to be several inches across, and is sure to attract attention by its size, habitat, and large, baggy volva. On wilting or on being bruised, the pure white becomes stained with dingy brown. Though this Volvaria is well known to be edible, Cooke (British Edible Fungi, 1891, p. 228) says, perhaps over cautiously, it "is often eaten abroad, but we have never been induced to try it. Pink-spored species are, as a rule, suspicious." Though the writer has had repeated opportunities of seeing this species, he has found it only once or twice. It is brought as a great prize nearly every year, in July or August, to some Saturday exhibition of the Boston Mycological Club. And for the last two years a single superb specimen has been brought into Alstead, New Hampshire, to the School of Natural History, from a sugar grove in a neighboring town.

A second large species, *V. speciosa*, known in Europe, America,

and North Africa, is reported by McClatchie as abundant in California, and is said to be edible. It is grayish and very viscid. The same species is called poisonous by Bresadola, in his recent popular account of the edible and poisonous fungi of Middle Europe (Funghi Mangerecci e Velenosi, 1899).

Volvaria volvacea has been reported from a few other places in this country, but never in such abundance as in Lawrence. It is usually much smaller. It grows also in Europe and in Ceylon.

An interesting series of buttons, collected in Mr. Silsbee's locality, was shown to the writer by Mr. G. E. Morris. Even the smallest were very dark colored above — almost black — and with a velvety look. On the older ones, and on the ruptured volva, the color was less intense. There is little doubt that this species is edible, but caution is necessary.

Other species of Volvaria reported from this country are little known. One, *V. Loveiana*, found in Europe and in Canada (by J. Dearness, as reported by Lloyd) has a peculiar habitat — on decaying agarics (Clitocybe) and should accordingly be easily recognizable.

More information as to the occurrence of species of Volvaria in New England would be welcome. They may be easily preserved by drying.

Cambridge, Massachusetts.

MISCELLANEOUS NOTES ON NEW ENGLAND FERNS, — III.

George E. Davenport.

(Presented to N. Eng. Bot. Club, Dec. 2, 1901.)

Note 5. Subdivision of the New England Aspidieae. — In my last notes I explained my reasons for adopting Athyrium for *Asplenium filix-foemina* and now, as I intend adopting some generic changes in Aspidium it seems advisable to explain my reasons for doing so, and to preface my account of a most extraordinary fern by a synopsis of our New England Aspidieae.

The genus Aspidium as recognized by Prof. Daniel Cady Eaton in

his superb work on the Ferns of North America, and, as until recently, generally adopted in the United States, comprises all of the shield ferns with orbicular indusia centrally attached to the receptacle (peltate), and those also with cordate reniform indusia attached at the sinus, without regard to the character of the venation except in so far as it may serve the purposes of sectional relations.

As originally proposed by Olaf Swartz in 1800 or 1801 (Schrader's Journal), and more fully established by him in his Synopsis Filicum later on (1806), the genus consisted of a heterogeneous collection of species having little cohesion from natural affinities, but representing the best arrangement which had been made up to that time.

Subsequent revisions, fortified by the views of such eminent pteridologists as Drs. Presl, Mettenius and Hooker, gradually reduced its proportions to the limitations recognized by Prof. Eaton.

The genus as thus constituted has consisted of three well characterized types, which, while closely related, are readily separable into distinct entities.

The first of these types is represented by *Aspidium trifoliatum* Swartz, which stands as the type of Aspidium proper, and which is a species with orbicular, peltate indusia, and anastomose venation.

The second type is represented by *Aspidium Lonchitis* Swartz, which, while it has peltate indusia, as in Aspidium proper, has its venation wholly free. Not only this but it possesses additional characters of such a nature that many able authorities have treated it as generically distinct in every way from Aspidium. Now it was upon this species that Roth founded his genus *Polystichum* somewhere between 1798 and 1800 (exact date uncertain, but the same as that at which he established Athyrium; see previous note in RHODORA, ii. 267), and *Polystichum Lonchitis* Roth, with its peltate indusia, free venation, and special characters to be described, stands as the type for Roth's genus.

In considering the history of the early genera it appears that nearly, if not all of them consisted of a heterogeneous medley of species which are now seen to have represented different genera, and this justifies adopting the first correctly named species under the genus as the generic type; only such other species as conform to such type characters being accepted as rightfully belonging to the genus.

Following out this principle we find our third type in those members of the Aspidium genera with a cordate reniform indusium

affixed to the receptacle by a well defined sinus. Here we have by far the largest group of Aspidiums and our New England species exactly represent true *Nephrodium* as proposed by Richard in Michaux's Flora Bor.-Am. ii. 1803, the type being *Nephrodium marginale*. It is true that Richard named two other species in their order first, but as both belonged to other genera already established they naturally lapsed in favor of *N. marginale* which thus became the type species. As this species is characterized by having cordate-reniform indusia and *free veins*, it is clear that species with united veins cannot properly be considered as belonging to Richard's genus by anyone attaching importance to the system of venation; yet many authors have persisted in treating Nephrodium as if it had been founded on species with united veins.

The genus, even as here recognized, is made up of two well characterized sections, one consisting of the *marginale* and *spinulosum* group with evergreen, or nearly evergreen fronds, fascicled stout rootstocks forming crowns, and with several roundish fibro-vascular bundles in the stipe; and the other with softly herbaceous fronds, long slender creeping rootstocks, and two flattish bundles in the stipe.

This whole matter is discussed more fully in my Fern MSS. where I have made the characters last mentioned the basis for a divisional arrangement of our New England Ferns.

The following brief synopsis will show the arrangement adopted here for our New England Aspidiums: —

Tribe Aspidieae — J. Smith. *Sporophyte* (plant-body) large, with fascicled rootstocks forming crowns, or creeping rhizomes; fronds variously compounded, evergreen or herbaceous; *sporophylls* (fruit-bearers) with the sori covered by peltate (attached at the centre), or cordate-reniform indusia, the latter being attached at the sinus; venation free or anastomose.

I. Aspidium (from ἀσπίς — meaning buckler or shield) Swartz, as emended. — Sori orbicular, indusium peltate, veins anastomose. Not represented in New England.

II. Polystichum (from πολύς — many, στίχος — order) Roth. — Sori orbicular, indusium peltate, veins free. The members of this genus are further distinguished by the irregular auricled pinnae, coriaceous texture and spiny toothed lobes. The genus is represented in New England by two ferns:

1. *Polystichum acrostichoides* Schott, Christmas Fern, and

2. *Polystichum aculeatum* Roth, var. **Braunii** (Spenner), n. comb. (*Aspidium Braunii* Spenner.) I am not sure that those who maintain specific rank for this fern are not correct, but prefer for the present to adhere to Prof. Eaton's treatment.

III. NEPHRODIUM (from νεφρός — kidney, with reference to the form of the indusium) Richard.[1] — Indusium kidney-shaped, or cordate-reniform with a sinus attachment. The genus is well represented in New England by two distinct sections, as follows: —

Section 1. *Evergreen*, or partially so; the sporophylls generally withering in late autumn; rootstocks caudiciform, forming crowns; fibro-vascular bundles 3 to 7 roundish. The section embraces the following species: —

N. marginale Richard, *N. cristatum* × *marginale* Davenport, *N. cristatum* Richard, *N. Goldieanum* Hooker, *N. Boottii* Davenport acc. to Gilbert, *N. spinulosum* Desvaux, and *N. fragrans* Richardson.

Section 2. *Herbaceous*; fronds withering early, rootstocks rhizomatose, wide creeping; fibro vascular bundles flattish, two in number. Contains the following species: — *N. Thelypteris* Desvaux, *N. Noveboracense* Desvaux, *N. simulatum* Davenport.

A fern now to be described will become a member of the First Section, as will some other forms to be described later on.

In the arrangement which I have here presented, and which it is my intention to adopt in practice, I have not taken into account Bory's *Lastrea*, as being apparently founded on a misapprehension of the true character of Nephrodium it can only properly be regarded as a synonym; neither have I taken into account Adanson's Dryopteris, which the Rochester advocates are striving so hard to establish, because a genus so ill defined, with its type standing for one thing and its description for another, has no just claim for consideration as against the more clearly defined Nephrodium which has been in use for nearly a century.

NOTE 6. AN ANOMALOUS FERN. — Late in the autumn of 1894 (Nov. 4) I found growing in one of the woodland swamps in Medford, near plants of *Nephrodium marginale*, *cristatum* × *marginale*, *cristatum*, *Clintonianum* and *spinulosum*, a strange fern which I could not satis-

[1] Richard's name does not appear in Michaux and for that reason some authors cite Michaux as authority for the names used therein, but Richard has been generally recognized as the real author.

factorily determine. The plant stood about two feet high, with the erect fertile fronds standing well above the sterile, and its whole aspect resembling that of an abnormal form of *Clintonianum*.

On examining the rootstock I found it to be sub-erect, with a growth similar to that in *N. marginale*, but sufficiently distinct from that of *N. cristatum* × *marginale* to suggest its being a probable hybrid between *marginale* and *Clintonianum*.

As the particular section of woodland where it grew had been staked out, and the plant appeared to be in danger of an early extermination, I transplanted it to my own grounds where I could watch and study it.

This I have done since, until the plant with a single crown has become a large clump, with a breadth of something like twelve inches and a length of eighteen or twenty; and with sixteen crowns, on one of which last spring I counted 22 crosiers.

Notwithstanding the fact that this extension had occurred by means of lateral growth, the original crown has maintained its sub-erect position, while the later crowns which have developed from lateral offshoots have assumed in one direction more the character of *Clintonianum* with a distinctly lateral or rhizomatose growth, and in the other direction the caudiciform character of the original crown; so that there has existed on the same plant crowns of two types, viz.: that of *N. marginale* and that of *Clintonianum*.

Not only that, but the fronds from the different crowns have shown all manner of variations that might serve as instructive object lessons for some of our industrious species and variety makers.

The behavior of the plant during successive seasons has been noticeable from the fact that some years it would produce a large percentage of perfect fronds, and in others a large proportion of abortive ones, while none have ever reached the original height of the plant.

It has also been noticeable that the position of the sori varied on different fronds from different crowns. Thus on fronds growing on the lateral ends of the clump the sori are medial, as in normal *Clintonianum*, or sub-marginal as would be the case in a hybrid between *marginale* and *Clintonianum*, while on fronds from the original crown, and the later sub-erect crowns, and sometimes on the same frond, a mixture of medial and costal sori occurs, and on those from the latest sub-erect crowns a costal series of sori generally prevails.

The character of the fibro-vascular bundles is the same as in all members of the group to which this plant belongs.

I doubt if it is possible to formulate any absolute rule for determining the different species and varieties of the evergreen shield ferns from the character of the vascular bundles,—certainly not from their number, which is regulated by the size of the frond and the stoutness of the stipe. Thus in large fronds of the different species the number may be seven, and in small fronds five, or even three, at the base of the stipe, with corresponding reductions above.

Our plant is no exception to this rule, but it has shown such remarkable variations from all other forms of the group that it seems worthy of special notice.

Several seasons' observations have left me as much in the dark as to its origin as at first.

That it is a hybrid I believe, but between what ferns it is impossible to say. *Marginale* characters appear in the sub-erect crowns, and in the sometimes nearly marginal elevated coriaceous sori; *Clintonianum* characters in the decumbent lateral crown and medial sori; *Spinulosum* characters in the sometimes deltoid lower pinnae, elongated pinnules, and sharply, almost spinulosely toothed lobes.

As just such another plant may never be found again it does not seem worth while to dignify this one with a name, but in case another should be found the following diagnosis may assist in determining it more clearly.

Mature sporophyte large (12 to 24, or more inches tall), partially evergreen, sterile fronds persistent, sporophylls gradually withering away; rootstock decumbent, fasciculate, original crown sub-erect increasing laterally, at length forming large composite clumps, with sub-erect, decumbent or lateral, crowns all connected by short, stout rhizomes, combining types of *marginale* and *Clintonianum*; crosiers densely clothed with a mixture of large ovate and narrowly lanceolate pale brown scales. Stipes usually 4 to 8 inches long, sometimes longer, and, as well as the primary rachis, stramineous, often darker below, deeply channelled along the face, clothed at the base, and well above, with the ascending scales from the crosiers, and chaffy along the upper rachises. Laminae 12 to 18 inches, or more, in length, 4 to 10 inches broad in the middle, narrowing both ways, often abruptly so at the acuminate apex, which then resembles that of *N. marginale*; once or twice pinnate, or thrice pinnatifid; the middle pinnae

on perfect fronds long lanceolate, acuminate, the lower pinnae shorter often deltoid with acute apices, the upper series narrowing abruptly or gradually to an acute or acuminate apex; superior pinnules generally the longest but the order sometimes reversed; lobes more or less deeply toothed and partially spinulose, texture sub-coriaceous, surfaces smooth; venation, and fibro-vascular bundles as in other members of this group. Sori medial, costal or sub-marginal.

Abnormal fronds defy description, and as it is impossible to get a clear conception of the unique character of this fern from single fronds, a series of the most characteristic will be photographed for distribution.

MEDFORD, MASSACHUSETTS.

REDISCOVERY OF PHASEOLUS PERENNIS IN NEW ENGLAND.—In preparing his check-list of the Leguminosae of New England, Hon. J. R. Churchill took much pains to investigate the various reports as to the occurrence of *Phaseolus perennis*, Walt., in New England.

He has published the result of his work with some detail in RHODORA, II : 92 — April, 1900. He states that the only known specimens from New England were collected nearly fifty years ago at or near New Haven, Connecticut, and as he could find no specimens collected in more recent years, nor any botanist who had seen it, he would infer that it had disappeared from our flora. It is therefore a pleasure to place this Phaseolus in good standing again among our New England plants, and record for it a present and well established station.

I secured specimens of it at Norwalk, Connecticut, the past summer, in flower on August 23rd, and in good fruit September 16th. This station is about thirty five miles from New Haven, so it can hardly be the one from which the specimens referred to by Judge Churchill were taken. The Norwalk station is in a patch of rocky woodland, and only a few rods from the border of a salt marsh. The growth was strong and healthy, the vines trailing over the ground and forming a thick mat covering about a square rod, to the exclusion of most other plants. — C. H. BISSELL, Southington, Connecticut.

SOME PLANTS RECENTLY FOUND IN AND AROUND NORTH EASTON, MASSACHUSETTS.— *Solanum carolinense*, L. (Horsenettle.) This western species of Solanum was found in a dry location in the town of

North Easton, August, 1899. Two to three hundred specimens were found on the spot. The present year the station was visited and the plant seems to have increased considerably.

Solanum rostratum, Dunal, was found in a cultivated field on the border line between South Easton and Brockton, July, 1900. The specimen located was of enormous size, being $3\frac{1}{2}$–4 feet high.

Ajuga reptans, L. According to Gray's Manual this species is naturalized near Saco, Maine, Montreal, etc. In July of this year a station was found near Elm street, North Easton, in a rather moist meadow. The plants were growing in good clumps, and if the present conditions remain there is hope of a good increase of the specimens. — CARL BLOMBERG, North Easton.

NOTES ON THE BLUE-BERRIED HUCKLEBERRY. — I have read the communications in RHODORA from time to time concerning *Gaylussacia resinosa glaucocarpa* Robinson with much interest. The variety, if it be a variety or rather a distinct species, as it may prove later, is common in eastern Connecticut in the towns of Plainfield, Brooklyn, Canterbury, Voluntown and Sterling. It occurs in distinct clumps generally associated with *G. resinosa* Torr. and Gray. When I was a child I used to pick its berries on account of their larger size, and because of its being different from the common black huckleberry. By some it was considered inferior to the black. I always regarded it as an oddity, and used to hear the older ones speak of it as a cross between the black huckleberry and blueberry. There was probably no foundation for the theory of its being a cross, other than that it was a bluish-black, and that the black huckleberry and blueberry grew near it. It was locally known as the blue-black huckleberry. While it is characteristic of *G. resinosa* and of some species of *Vaccinium*, in many ways, it is, nevertheless, so distinct that it may be readily separated from them in the field by its manner of growth, which is more vigorous than *G. resinosa*, and by its glaucous leaves. — JOHN L. SHELDON, University of Nebraska, Lincoln, Nebraska.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,—VIII.[1]

Emile F. Williams.

[The + sign indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

Lobeliaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Lobelia cardinalis, L.	+	+	+	+	+	+
" Dortmanna, L.	+	+	+	+	+	+
" inflata, L.	+	+	+	+	+	+
" Kalmii, L.	+	+	+	—		+
" spicata, Lam.	+	+	+	+	+	+
" syphilitica, L.	+					+

Campanulaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Campanula aparinoides, Pursh.	+	+	+	+	+	+
" glomerata, L.				+		
" rapunculoides, L.	+	+	+	+	+	+
" rotundifolia, L.	+	+	+	+		+
Jasione montana, L.					+	
Specularia perfoliata, A. DC.	+	+	+	+	+	+

Diapensiaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Diapensia lapponica, L.	+	+	+			

[1]Printed in Rhodora as supplementary material.

PLUMBAGINACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Statice Limonium, L. var. caroliniana, Gray.	+	+		+	+	+

PRIMULACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Anagallis arvensis, L.	+	+		+	+	+
Glaux maritima, L.	+	+		+		
Hottonia inflata, Ell.	+			+	+	+
Lysimachia Nummularia, L.	+	+	+	+	+	+
" producta, Fernald	+	+	+	+		+
" punctata, L.	+			+		+
" quadrifolia, L.	+	+	+	+	+	+
" stricta, Ait.	+	+	+	+	+	+
" thyrsiflora, L.	+	—	+	+	+	+
" vulgaris, L.	+	+		+	+	
Primula farinosa, L.	+					
" mistassinica, Michx.	+		+			
Samolus Valerandi, L. var. americanus, Gray.	+		+	+	+	+
Steironema ciliatum, Raf.	+	+	+	+	+	+
" lanceolatum, Gray.	+	—	+	+	+	+
Trientalis americana, Pursh.	+	+	+	+	+	+

EBENACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Diospyros virginiana, L.						+

Oleaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Fraxinus americana, L.	+	+	+	+	+	+
" pennsylvanica, Marshall (*F. pubescens*, Lam).	+	+	+	+	+	+
" pennsylvanica, Marshall, var. lanceolata, Sargent (*F. viridis*, Michx. f.)	+	+	+	+		+
" sambucifolia, Lam.	+	+	+	+	+	+
Ligustrum vulgare, L.	+	—		+	+	+
Syringa vulgaris, L.	+	+	+	+	+	+

Apocynaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Apocynum androsaemifolium, L.	+	+	+	+	+	+
" cannabinum, L.	+	+	+	+	+	+
Vinca minor, L.	+		+			+

Asclepiadaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Acerates viridiflora, Ell.						+
Asclepias incarnata, L.	+	+	+	—		+
" " var. pulchra, Pers.	+	+		+	+	+
" obtusifolia, Michx.		+	+	+	+	+
" phytolaccoides, Pursh.	+	+	+	+	+	+
" purpurascens, L.		—		+	+	+
" quadrifolia, L.		+	+	+	+	+
" syriaca, L. (*A. Cornuti*, Decaisne.)	+	+	+	+	+	+
" tuberosa, L.		+	+	+	+	+
" verticillata, L.				+	+	+
Vincetoxicum nigrum, Moench.			+	+	+	

SANTALACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Comandra livida, Richardson.	+	+	+			+
" umbellata, Nutt.	+	+	+	+	+	+

ORCHIDACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Aplectrum hiemale, Nutt.		—	+	+		+
Arethusa bulbosa, L.	+	+	+	+	+	+
Calopogon pulchellus, R. Br.	+	+	+	+	+	+
Calypso borealis, Salisb.	+	+	+			
Corallorhiza innata, R. Br.	+	+	+	+		+
" multiflora, Nutt.	+	+	+	+	+	+
" odontorhiza, Nutt.	+	—	+	+	+	+
Cypripedium acaule, Ait.	+	+	+	+	+	+
" arietinum, R. Br.	+	+	+			
" parviflorum, Salisb.	+	—	+	+		+
" pubescens, Willd.	+	+	+	+	+	+
" spectabile, Salisb.	+	—	+	+		+
Goodyera Menziesii, Lindl.	+					
" pubescens, R. Br.	+	+	+	+	+	+
" repens, R. Br. var. ophioides. Fernald.	+	+	+	+		+
" tesselata, Loddiges.	+	+	+	+		+
Habenaria blephariglottis, Torr.	+	+	+	+	+	+
" bracteata, R. Br.	+	+	+	+	+	+
" ciliaris, R. Br.				+	+	+
" dilatata, Gray.	+	+	+	+		+
" fimbriata, R. Br.	+	+	+	+	+	+
" Hookeriana, Gray.	+	+	+	+	+	+
" " var. oblongifolia, Paine.	+	+		+		
" hyperborea, R. Br.	+	+	+	+		+
" lacera, R. Br.	+	+	+	+	+	+
" obtusata, Richardson.	+	+	+	+		
" orbiculata, Torr.	+	+	+	+		+
" psycodes, Gray.	+	+	+	+	+	+
" tridentata, Hook.	+	+	+	+	+	+
" virescens, Spreng.	+	+	+	+	+	+
Liparis liliifolia, Richard.		+	+	+		+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Liparis Loeselii, Richard.	+	+	+	+	+	+
Listera auriculata, Wiegand.	+	—	+			
" convallarioides, Nutt.	+	+	+			
" cordata, R. Br.	+	+	+	+	+	
Microstylis monophyllos, Lindl.	+	—	+	—		
" ophioglossoides, Nutt.	+	+	+	+	+	+
Orchis rotundifolia, Pursh.	+		+			—
" spectabilis, L.	+	+	+	+	+	+
Pogonia affinis, Austin.				+		+
" ophioglossoides, Nutt.	+	+	+	+	+	+
" pendula, Lindl.	+	+	+	—		+
" verticillata, Nutt.	+	+	+	+	+	+
Spiranthes cernua, Richard.	+	+	+	+	+	+
" gracilis, Bigelow.	+	+	+	+	+	+
" latifolia, Torr.	+	+	+	+		+
" praecox, Watson.				+	+	+
" Romanzoffiana, Cham.	+	+	+			+
" simplex, Gray.				+	+	+
Tipularia discolor, Nutt.				—		

Notes upon the Above Lists. — Old and indefinite reports of plants, which I have been unable to verify by the most diligent inquiry, are purposely omitted. They are as follows:

Asclepias obtusifolia, Michx. — accredited to Maine — Portland Catalogue.

Asclepias quadrifolia, L. — accredited to Maine — Portland Catalogue.

Asclepias tuberosa, L. — accredited to Maine — Portland Catalogue.

Asclepias verticillata, L. — accredited to Maine — Portland Catalogue.

Fraxinus pennsylvanica, Marsh. var. *lanceolata*, Sargent. — accredited to R. I. — Bennett's List (as *F. viridis*).

Campanula rotundifolia, L. var. *arctica*, Lange, to which variety dwarf specimens from the alpine summits of the White Mountains have been referred by some botanists, is not admitted. In my opinion such specimens are but a reduced form of the type, due principally to soil and exposure.

Diospyros virginiana, L., has been accredited to Rhode Island in

some lists. I have omitted it, as I find on examination that the report is based upon a single tree of very doubtful origin, growing on a farm at Cumberland, Rhode Island.

Campanula glomerata, L., is still well established and thriving in the Danvers, Massachusetts, region, where it was reported more than fifty years ago. It seems strange that it has not obtained a foothold in other New England stations.

Jasione montana, L., has overrun Conanicut Island, Rhode Island, and it is likely to spread.

Syringa vulgaris, L., is such a persistent plant that it must be included in a list of plants growing without cultivation. I have seen it in a thriving condition, on old farmhouse sites in New Hampshire and Maine, abandoned fifty to one hundred years ago.

The Apocynums of New England require revision. It has therefore seemed to me best to follow the conservative treatment of Gray's Manual, until the abundant material which has been collected by others and myself can be studied by a competent authority.

Mr. Fernald collected a few years ago on waste land in Cambridge, Massachusetts, a few specimens of *Lobelia syphilitica*, L., one of which is now in the Gray Herbarium. As these plants were doubtless waifs, the species has not been noted in the lists as occurring in Massachusetts.

The record of *Hottonia inflata*, Ell., for Maine rests upon a single specimen collected near Mt. Agamenticus by Mr. John C. Parlin and now preserved in his herbarium. One branch was detached, and it is now in the herbarium of the writer.

The following orchids rest upon old and indefinite or else untrustworthy records. I have been unable to verify their occurrence, notwithstanding an examination of twenty or more of our principal herbaria, and the writing to scores of correspondents:

Aplectrum hiemale, Nutt. — accredited to Maine — Portland Catalogue.

Liparis liliifolia, Richard. — accredited to Maine — Portland Catalogue.

Spiranthes praecox, Watson. — accredited to Maine — Portland Catalogue.

Cypripedium arietinum, R. Br. — accredited to Massachusetts — Amherst List.

Cypripedium arietinum, R. Br. —accredited to Connecticut — Bishop's List.

Cypripedium parviflorum, Salisb.— accredited to Rhode Island — Bennett's List

Goodyera repens, R. Br. var. *ophioides*, Fernald. — accredited to Rhode Island — Bennett's List.

Habenaria ciliaris, R. Br. — accredited to New Hampshire — Baldwin's Orchids of N. E.

Habenaria ciliaris, R. Br. — accredited to Vermont — Baldwin's Orchids of N. E.

(Likewise omitted in Brainerd, Jones & Eggleston's Flora of Vermont.)

Liparis liliifolia, Richards. — accredited to Rhode Island — Bennett's List.

Listera cordata, R. Br. — accredited to Connecticut — Bishop's List.

Orchis rotundifolia, Pursh. — accredited to New Hampshire — Baldwin's Orchids of N. E.

Pogonia pendula, Lindl. — accredited to Rhode Island — Bennett's List.

Tipularia discolor, Nutt. — accredited to Vermont — Baldwin's Orchids of N. E.

(This has been omitted likewise in the Flora of Vermont.)

It seems pertinent to call attention again to the great difference in value between the + sign, indicating that a specimen has been seen, and the — sign, which rests only upon a printed record. Unless this record can be backed up by an herbarium specimen, it can be accepted only with a certain amount of doubt.

Of the most recent segregations accredited to New England not one has been admitted in my list. They are based upon unreliable and inconstant characters. I am well acquainted with all of these variations, and in my opinion they are at best but forms which it is preposterous to erect into species.

Goodyera repens, R. Br., the European type of the species, which was accredited to Vermont in the recently issued Flora of Vermont, has been dropped. The specimens upon which the record was made agree better with the variety *ophioides* of Fernald.

Habenaria Hookeriana, Gray, var. *oblongifolia*, Paine, has been retained, although in the opinion of the writer the variety is not well enough marked, at least in our New England plants, to entitle it to recognition. Equally poor varieties might easily be made out of

mere leaf variations in *Habenaria orbiculata*, *H. obtusata*, *Orchis spectabilis*, etc., etc.

There is a single specimen of *Corallorhiza striata*, Lindl., in the herbarium of the University of Vermont, collected many years ago by Joseph Torrey — date and locality not given, according to ancient usage. The plant, however, is believed to have been collected near Burlington. Prof. L. R. Jones writes me: "We shall have to await its rediscovery before so crediting it in printed lists." I can but acquiesce in this wise suggestion.

Epipactis Helleborine, Crantz, was introduced in 1898, with some garden plants from New York State, at Stockbridge, Mass. It was hardly likely to persist, however, as it selected a hedge along the main street for a habitat.

Spiranthes Romanzoffiana, Cham. is reported to me on good authority as growing on Mt. Greylock, Massachusetts. As there is no published record of the fact, and I am unable to obtain specimens at present, I am obliged to omit it from my list until I can record it without the possibility of a doubt.

Orchis rotundifolia, Pursh, is accredited to Connecticut on the authority of Robbins, who collected it at Norfolk (Bishop's List). This report is very old and it may well be that the plant is now extinct in this town, where it has not been seen for many years.

I have been particularly impressed in the study of this interesting order of plants by the fact that the tenure of life of many of our rarer species of orchids is very insecure. It is evident that many of them such as *Pogonia affinis* and *pendula*, *Tipularia discolor*, *Aplectrum hiemale*, *Calypso borealis*, several Cypripediums, etc., survive in some of the New England States only in the most secluded localities. Even there they are doomed to early extinction in many instances, by the growing demands for timber, by forest fires and by the clearing of the land.

Such plants as Hitchcock, Robbins, Tuckerman, and others reported are seldom or never seen now in their former homes, but must be sought for in the few localities, if there are any, which have not yet been called upon to satisfy the insatiate maw of the pulp mill or to suffer the withering influence of an increasing population.

BOSTON, MASSACHUSETTS.

Vol. 3, No. 36, including pages 285 to 315 and title page of volume, was issued 19 December, 1901.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 February, 1902 No. 38

THE MAINE COAST AT CUTLER.

G. G. Kennedy.

The flora of Mt. Desert has been so well described in Rand & Redfield's volume that the list there given might be considered sufficient for the whole seashore of Maine, but to the eastward lies an almost unexplored territory with a more boreal flora and cold winds and waters.

The innumerable islands, bays and rivers of the Maine coast do not extend eastward beyond Machias Bay, and from this point to Quoddy Head, a distance of about 25 miles, we have a bold shore with a full east exposure, open ocean, treacherous currents, and much fog. It is the entrance to the Bay of Fundy and from fifteen to twenty miles off shore lies Grand Manan Island with its cliffs and fog. The Bay of Fundy, some sixty miles wide at its mouth, extends one hundred and fifty miles northeasterly, and uninfluenced by warmer currents from the southern ocean areas, maintains its well-earned reputation as a cold wet sea.

This twenty-five miles of coast is shared by three townships, Cutler, Trescott and Lubec, or to take the shore designations proper for such a sea-faring community, Little River, Bailey's Mistake and Quoddy Head; Lubec village lying on the narrow strait north of Quoddy Head.

A short account of the flora of the region as observed during three days spent in July last at Cutler on Little River, may be interesting to the readers of Rhodora.

Little River is a small fiord just east of Little Machias Bay with a sailing area of less that a mile from Little River Light. Its situation is 44° 40′ N. and 67° 15′ W. of Greenwich. The village of Cutler is on this fiord and its picturesque beauty has been described in several magazine articles on the coast of Maine.

My first walk from the hotel towards the shore at Schooner Head showed how northern the vegetation looked and how much it reminded one of the Lower St. Lawrence at the Saguenay region. *Abies balsamea*, Miller, and *Picea alba*, Link, fruiting when only 10 to 15 ft. high grow quite to the water's edge; one group of white spruces from which I collected the seashore moss *Ulota phyllantha*, Brid., stretched its branches over water many feet deep which beat about the base of the cliff, wetting the halophilous moss, *Grimmia maritima*, Turner, with its spray, while *Empetrum nigrum*, L., in deep cushions and *Lonicera caerulea*, L., in breast-high bushes covered the ground. On the rocky beach grew another Saguenay-Tadousac plant, *Iris Hookeri*, Penny, cited in Britton's new Manual as found on "River shores Newfoundland to Quebec and Maine"; but I think Prof. Macoun is right when he says in Cat. Can. Plants, Vol. II. p. 25, "Apparently peculiar to the sea coast and always found within the limit of the spray from the sea." All Macoun's stations are marine and this station at Cutler extends its limits from the Gulf of St. Lawrence around the coast to the United States. Fernald's No. 147 Maine Flora on which perhaps the Maine citation for *I. Hookeri* is founded is a plant with a very small pod but the beak of true *I. versicolor*.

On this rocky beach grew also a tall, slender dark green *Sagina nodosa*, Fenzl, which on examination proved to be different from our usual New England plant in being quite glabrous, and thus exactly like the Tadousac plant. It is the true *Sagina nodosa* of Europe, and all our other New England specimens appear to be the var. *pubescens* of Koch, while all the specimens in the Gray Herbarium from north of the United States, including one from Isle Royale, Lake Superior, are the true *S. nodosa*. The var. *pubescens* I found also at Cutler and perhaps the two forms on the coast do not intrude on each other's territory, as the glabrous plant has not before this been reported from New England, while the var. *pubescens*, though cited as rare in the Mt. Desert Flora, is quite common at Biddeford Pool, Me., and other points on the coast south to Massachusetts.

The seashore Plantagos are sufficiently troublesome, but one little Tadousac plant attracted my notice immediately — the *Plantago borealis*, Lange, described in Flora Danica, Vol. XVI. t. 2707, and recorded from Greenland and Iceland and extreme northern Norway. It does not appear to have been separated by Macoun in his Cata-

logue of Canadian plants, but in Contributions from the Herbarium of the Geological Survey of Canada, xi. (reprinted from Can. Rec. Sci. 1897) 475, Mr. James M. Macoun refers various Labrador and Hudson Bay specimens to *P. borealis* although no mention is made of any Gulf of St. Lawrence specimens. I collected it at Tadousac in Aug., 1892, and the Gray Herbarium has it from various stations in Labrador, but not from the United States.

The *Plantago decipiens*, Barneoud, from Cutler exactly matches the original description in being extremely woolly on the scape just below the inflorescence and somewhat woolly at base, with flat linear leaves about equalling the scapes. The varying forms of *Plantago decipiens* and *P. maritima* on the New England coast should be carefully collected for future study.

While coming from the shore one evening we crossed a pasture and in a wet place under the alders collected a *Hieracium* new to me which proves to be *H. floribundum*, Wimmer and Grabouski, a well known species of central Europe. This plant is new to the United States, and doubtless an importation from Europe, though Cutler is not exactly a port of entry; yet the plant was growing quite luxuriantly under the alder bushes.

In a wet place near the shore but not in salt marsh grew a very robust *Poa* about 3 dm. high and with a culm 2 mm. or more thick. I thought I had *Poa alpina*, L., but it proved to be *P. pratensis*, L., var. *domestica*, Laestad.: the arctic *Poa pratensis* has five varieties affixed to it in Lange's Greenland Flora and the Cutler specimen exactly matches authentic Greenland and Iceland specimens in the Gray Herbarium of var. *domestica*. It has a Briza-like appearance from the large spreading spikelets and as they are of a violet green color the plant is quite striking. Lange says of it, "not unlike *Poa alpina*."

A curious feature of the rocky shore at Corbett's Point is a series of small basins in the ledgy rocks holding fresh spring water: Mr. Corbett told us that during the extreme drought of the summer of 1900 he found his cow never cared for water on her return from pasture, although her usual drinking place was absolutely dry. Out of curiosity he one day followed her to the pasture and saw her go to the shore and drink from one of these basins, and this she continued to do all summer. These basins are of different sizes, from an area of two square feet to only a few inches, and a dozen or more

in number. They all contain the larvae of fresh water insects and thus differ from the similar salt water basins on the same rocks in which are various seaweeds, and yet both sets of basins are only just above high water mark and must be often washed by the sea spray. There are no higher springs visible from which their supply could be explained, and yet each basin has a gentle weeping outlet, while the basins are not all on the same level. In one of these little outlets I found the specimen of *Sagina nodosa*, var. *pubescens*, also the true *Galium trifidum*, L., with very thick leathery leaves, and *Euphrasia Randii*, Robinson, the latter having previously been found only on the islands south of Mt. Desert; while in a mossy place in the woods I collected *Euphrasia Americana*, Wettst. (See RHODORA III. pp. 273 and 274.)

We remained at Cutler in a quiet summer hotel from Saturday noon, July 13th, to Tuesday noon, July 16th. Although not on a botanical trip I had my press along, and the few plants I brought home may give some idea of what might be found by a collector who should devote himself to this wild and unexplored shore.

NOTEWORTHY PLANTS OF SOUTHEASTERN CONNECTICUT,— III.

C. B. GRAVES.

(For previous articles of this series, see RHODORA, I, 67; III, 63.)

I AM indebted to Prof. F. Lamson-Scribner and Mr. E. D. Merrill for verifying the grasses mentioned below, and to Dr. B. L. Robinson and Mr. M. L. Fernald for assistance upon some of the other species. Those marked with one star are now, I believe, for the first time listed from Connecticut. Those with two stars have not, so far as I am aware, been reported from New England before.

* *Paspalum Muhlenbergii* Nash. Open sandy soil, Poquonnoc Plain, Groton.

* * *Panicum stipitatum* Nash. Discovered by Mr. C. H. Bissell and the writer at Selden's Cove in Lyme, Aug., 1901.

* *Agrostis coarctata* Ehrh. In wet sand, edges of salt marsh, Groton. Foliage of growing plant bluish green.

* *Puccinellia angustata* (R. Br.) Scribn. Blackhall River, Old Lyme, June, 1900, growing in tufts in the narrow border of salt marsh. A northern species not hitherto reported, I believe, south of the coast of Maine.

* *Spartina juncea* (Michx.) Willd. (*S. caespitosa* A. A. Eaton). Edge of salt marsh, Groton.

* *Elymus hirsutiglumis* Scribn. Banks of Connecticut River near Deep River.

* *Elymus robustus* Scribn. & Sm. Frequent in sandy soils, valleys of Thames and Shetucket Rivers.

* *Eleocharis palustris* var. *vigens* Bailey. In shallow water, Dodge's Pond, East Lyme. This form, long known in Maine and Vermont, has not to my knowledge been recorded from any other New England state.

* * *Carex nigro-marginata* Schwein. Rare among loose rocks, Lantern Hill, North Stonington.

* *Juncus tenuis* var. *anthelatus* Wiegand. Not rare in sandy soil, New London and Groton.

* * *Juncus brachycarpus* Engelm. Near Ocean Beach, New London, in partially reclaimed salt marsh.

Desmodium humifusum Beck. This species was reported by the writer and listed in the "Additions" to Bishop's Catalogue of Conn. Plants, 1898, but, as it has seemed since, upon insufficient grounds. It was therefore omitted from the last edition of the Catalogue, 1901. The collection this past season of a fuller series of more mature specimens and comparison with material in the Gray Herbarium leave no doubt of the correctness of the original determination. The species should accordingly be restored to its place in the Connecticut Flora. The specimens cited come from a very small patch in dry woodland near this city, which is the only station known to me. It is apparently one of the rarest of the Desmodiums.

* *Utricularia resupinata* B. D. Greene. This delicate little bladderwort was discovered last July growing sparingly along the margin of one of the ponds in East Lyme.

* *Utricularia biflora* Lam. In shallow water, pond on Poquonnoc Plain, Groton.

* *Nymphaea reniformis* DC. (*N. tuberosa* Paine). Still deep water of Selden's Cove, Lyme. Discovered in Aug., 1901, by

Mr. C. H. Bissell and the writer. This species has not apparently been found before in New England outside of Vermont.

* *Spiraea prunifolia* Sieb. & Zucc. Escaped and established by roadsides at several points in Groton and Waterford. Seen only in the double-flowered form.

Spiraea Japonica L. f. Well established along a highway at one point in Groton.

* *Solanum Lycopersicum* L. The common tomato should be included in the Conn. Flora. It is not rare as an escape on shores. Last August many plants were noticed in the tangle of vegetation on a low sandy island at Selden's Cove, Lyme.

NEW LONDON, CONNECTICUT.

THE DWARF MISTLETOE AT BRADFORD, VERMONT. — While driving on June 26 along a country road about five miles west of Bradford I was surprised, on looking up, to see two large "witches' brooms" near the top of a tall spruce (*Picea rubra*). Investigation showed that the dwarf mistletoe, *Arceuthobium pusillum*, was present in abundance. I had been looking for the plant, but had not expected to find it in that locality, as it was on a dry hillside distant from any water-course. The brooms were large, one being two and one-half feet in diameter, the other smaller. I saw no other specimens near by, nor did I see another spruce, but being on a hunt for orchids, did not make a thorough search. — ALICE E. BACON, Bradford, Vermont.

LECHEA MAJOR IN NEW HAMPSHIRE. — On noticing by the list of *Cistaceae*, published in RHODORA, i, 212, that there had been no record of *Lechea major* in New Hampshire, Mr. John A. Wheeler has kindly sent to the Gray Herbarium and the Herbarium of the New England Botanical Club some excellent specimens of that species, which he had found growing in pastures near Milford, New Hampshire. Mr. Wheeler writes that the plant was observed at two stations about two miles apart. From long familiarity with the flora of the region, Mr. Wheeler believes these hitherto unnoticed colonies are of recent origin. — B. L. ROBINSON.

A LIST OF BRYOPHYTES FROM THE MT. GREYLOCK REGION.

A. LeRoy Andrews.

Our knowledge of the distribution of bryophytes depends upon collections made at points so widely separated and is, therefore, of so general a nature as compared with that of the higher orders of plant life that a list from a limited region may furnish something of interest in the way of a comparison and possibly fill desirably an occasional gap. From this standpoint the results of collecting done upon Mt. Greylock during the past summer seem worthy of passing note. The specimens were taken from the northern portion of the mountain-mass, at various points in the townships of Williamstown, New Ashford, North Adams and Adams, and will give at least a fair idea of the prevailing species. For the sake of definiteness I will confine the list to the mountain region, from brook-beds at base to its summit.

Locally its mosses and hepatics are of great interest as occurring, particularly in higher altitudes, in so many species not found elsewhere in the vicinity, and several will be noticed to be uncommon in the state. The mountain lacks alpine conditions and therefore alpine species. Subalpine sorts are, however, well-represented, the flora on the whole, as may be seen by comparison with the Vermont lists, resembling in a marked degree that of the Green Mountain region of that state.

Comparatively little collecting has been done in western Massachusetts, especially in Berkshire County. A short list of Berkshire bryophytes forms a part of Chester Dewey's plant-list for the county in the History of Berkshire County published in 1828. I know of no later attempt to treat systematically either the mosses or hepatics of the region. The same list was incorporated in Prof. Hitchcock's Geological Report of Massachusetts published in 1835.

The nomenclature of the following list follows as closely as possible that of Lesquereux and James' Manual and Prof. Underwood's treatment of Hepatics in 6th edition of Gray's Manual.

MUSCI.

Anomodon apiculatus, Br. & Sch.
A. attenuatus, (Schreb.) Hueben.
Atrichum angustatum, Br. & Sch.
A. undulatum, Beauv.
Aulacomnium heterostichum, Br. & Sch.
Barbula unguiculata, (Huds.) Hedw.
Bartramia pomiformis, (L.) Hedw.
Brachythecium reflexum, (Starke) Br. & Sch.
B. salebrosum, (Hoffm.) Br. & Sch.
B. Starkei, (Brid.) Br. & Sch.
Bryum argenteum, L.
B. bimum, Schreb.
B. caespiticium, L.
B. roseum, Schreb.
Ceratodon purpureus, (L.) Brid.
Dicranella heteromalla, Schimp.
D. varia, Schimp.
Dicranum fuscescens, Turn.
D. longifolium, Ehrh.
D. scoparium, (L.) Hedw.
Diphyscium foliosum, Mohr.
Drummondia clavellata, Hook.
Fissidens adiantoides, (L.) Hedw.
F. decipiens, De Not.
Funaria hygrometrica, (L.) Sibth.
Hedwigia ciliata, Ehrh.
Hylocomium splendens, Hedw.
H. triquetrum, (L.) Br. & Sch.
Hypnum crista-castrensis, L.
H. pratense, Koch.
H. Schreberi, Willd.
H. uncinatum, Hedw.
Leptobryum pyriforme, (L.) Wils.
Leucobryum vulgare, Hampe.
Leucodon sciuroides, Schwaegr.
Mnium affine, Bland.
M. cuspidatum, Hedw.
M. punctatum, L.
M. punctatum elatum, Schimp.
M. serratum, Laich.
M. stellare, Reich.
Neckera pennata, (L.) Hedw.
Orthotrichum strangulatum, Beauv.
Philonotis fontana, (L.) Brid.
Physcomitrium turbinatum, (Mx.) Brid.
Plagiothecium denticulatum, (L.) Br. & Sch.
P. turfaceum, Lindb.
Pogonatum alpinum, (L.) Roehl.
P. urnigerum, (L.) Beauv.
Polytrichum commune, L.
P. juniperinum, Willd.
P. Ohioense, Ren. & Card.
P. piliferum, Schreb.
Pylaisia intricata, (Hedw.) Br. & Sch.
Racomitrium aciculare, Brid.
Sphagnum acutifolium, Ehrh.
S. cymbifolium, Ehrh.
S. squarrosum, Pers.
Tetraphis pellucida, Hedw.
Thuidium delicatulum, (L.) Mitt.
Ulota crispa, Brid.
U. crispula, Brid.
U. Hutchinsiae, Schimp.
U. Ludwigii, Brid.
Webera elongata, Schwaegr.
W. nutans, Hedw.

HEPATICAE.

Bazzania trilobata, S. F. Gray.
Blasia pusilla, L.
Blepharostoma trichophyllum, Dumort.
Chiloscyphus polyanthos, Corda.
Conocephalus conicus, Dumort.
Fimbriaria tenella, Nees.
Frullania Asagrayana, Mont.
F. Eboracensis, Lehm.
Jungermannia barbata, Schreb.
Lepidozia reptans, Dumort.
Liochlaena lanceolata, Nees.
Lophocolea heterophylla, Nees.
Marchantia polymorpha, L.
Metzgeria conjugata, Lindb.
Porella platyphylla, Lindb.
Preissia commutata, Nees.
Ptilidium ciliare, Nees.
Scapania undulata, Dumort.

A few more species were found but as identification, from imperfection of specimen or other reason, was not certain, they are omitted for the present. Dr. Grout has called attention (RHODORA I, 55) to

the fact that *Leucodon sciuroides* is probably more common in New England than had been supposed and it has been recently found in Maine, New Hampshire and Vermont, though not before, so far as I know, from Massachusetts. *Racomitrium aciculare*, *Pogonatum alpinum* and *urnigerum* and some of the others are not of common occurrence in the state. *Scapania undulata* presented a purplish form possibly corresponding with var. *purpurea*, Nees. The list is by no means an exhaustive one but shows something of the possibilities of more careful observation and study in a locality which has been somewhat neglected.

Mt. Pleasant, Pennsylvania.

SOME PLANTS FROM PRINCE EDWARD ISLAND.

J. R. Churchill.

It would be hard to tell why Prince Edward Island was finally selected for our midsummer migration in 1901. The attractions were not exclusively botanical. Indeed I had been warned that the whole island was cleared and under cultivation, apparently to such an extent that there was no room there for wild flowers; and it was quite plain that my hungry botany-box must be filled with those plants only which, whether wanted or not, follow mankind and intrude upon his fields and gardens. I became quite convinced that my botanical fare would be limited to weeds and to the bold denizens of hedgerows, cultivated ground, roadsides and waste places. But there were alluring reports of a cool dry and bracing climate, of a most comfortable boarding-house at Tracadie Beach on the North shore, of freedom from fogs, and of the salt sea pleasantly warmed for comfortable bathing upon the sandy shoals in the bright sun.

Now even a botanist loves to bathe, provided the water is not too frigid; and he is not superior to the seductions of a good table and house; and I reasoned that even weeds, if new and fresh, are attractive and interesting, and moreover are essential to the complete furnishing of every well-regulated herbarium.

And so it came about that, on the evening of July 19, I landed at Summerside, and put up for two days at the Clifton Hotel, the best of the three modest inns of the quaint little village.

Prince Edward Island is 130 miles long; and the extreme breadth is 34 miles. It contains over 2100 square miles, and it lies between the 46th and 47th degrees of North latitude; which is about the same as Aroostook County in Maine. In altitude the island nowhere exceeds 500 feet, its bare rolling surface reminding one strongly of our Nantucket Island; although the great fields are more fertile and cultivated. Strikingly alike also are the two ancient seaports, Summerside and Nantucket-town, with their primitive weather-beaten buildings and quiet country streets.

It was quite in keeping with the predictions that among the first plants to attract attention were two weeds which grew along the plank sidewalks of these well kept streets. Our common Tall Buttercup (*Ranunculus acris*, L.) presented here invariably so peculiar an appearance, that I was quite at a loss to name it, until the recent note of Mr. Fernald (RHODORA, I, 227. Dec. 1899) came to mind; and it was then plain that this weed was *R. acris*, var. *Steveni*, Lange, and that I was now in the latitude where this broad-leaved form should prevail, as stated in Mr. Fernald's account.

The second gutter-plant was the Garden Cress or Peppergrass of Europe (*Lepidium sativum*, L.). It is much taller and more slender than our three common Lepidiums, and the pod is larger. Here, as in England, it is merely a garden escape and not indigenous.

At the eastern end of the village there was a considerable colony of *Cotula coronopifolia*, L. This pretty plant is botanically a near relative of our common Tansy, and the golden-yellow rayless flowers of both are so much alike that, if it were frequent enough to have a common name, it would or might popularly and appropriately be called the Dwarf Tansy. It was growing in deep soft mud by the edge of the marsh, and though low, its bright golden Tansy-like flowers made the plant quite conspicuous. Its history is interesting. South Africa is its home, but like Lord Bateman, it seems "determined to go abroad;—to go strange countries for to see." It was collected on salt marshes in Chelsea, Massachusetts, by Herbert A. Young in 1879, and by C. E. Perkins in 1880; and these specimens are in the Gray herbarium. Yet it was not considered entitled to mention in the Manual; nor is it recorded in Britton and Brown's Flora. Before 1884 it had reached California, and in the Synoptical Flora of North America (vol i. pt. 2, p. 366) it is said to be "thoroughly established on the [Pacific] coast — and on some watercourses in the interior: a rare ballast weed on the Atlantic coast."

In Part II of the Catalogue of Canadian Plants, by John Macoun (also published in 1884), on page 285, under "Un-named Species of Compositae," is the following note:—"(No. 1331.) In August, 1883, Mr. James Fletcher picked up in the neighborhood of Victoria, a small rayless composite, which at first sight might be referred to *Matricaria discoidea*, but which differs very materially from that species in many respects. It is evidently a denizen of ditches and muddy places, but the specimens are too few and incomplete for identification. Lower leaves laciniate, upper ones much less so. The whole plant quite smooth and branching at almost every leaf which sheaths both stem and branch." Afterward in 1886 (Part III, p. 552), *Cotula coronopifolia* is recorded as "abundant for some distance along a gutter in Fort Street, Victoria, Vancouver Island, 1885 (Fletcher). This is the plant described but not named under No. 1331."

These are the only records of its occurrence that I have been able to find; and it seems remarkable that a weed like this, with both disposition and ability to travel such great distances, should not establish itself more firmly and abundantly in its new homes.

The rest of my time on the island was spent at the Acadia hotel, Tracadie Beach, on the Gulf of Saint Lawrence, about fifteen miles across the island from Charlottetown the metropolis, and more than fifty miles from Summerside. The journey back and forth between these places, by the little narrow-guage railroad, gave a good opportunity to verify the bucolic account of this prosperous land, of which it has been said "It is one rich rolling arable farm, from Cape East clear up to Cape North,—a warm and sandy land, in a genial climate, without fogs." Except at Summerside, and a day's trip made to Charlottetown, all my collecting was done within five miles of Tracadie Beach.

Between the hotel at the edge of the sand-dunes, and the sea, stretched a low level strand thinly carpeted with *Festuca ovina; Agrostis alba; Poa glumaris* (?); *Carex silicea; Scirpus pungens; Juncus Balticus* (a slender and peculiar form); *Salsola Kali; Polygonum Raii; Limosella aquatica*, var. *tenuifolia; Suaeda* sp.?; *Glaux maritima; Potentilla Anserina; Spergularia borealis; Ranunculus Cymbalaria*, and other maritime plants. A step hence to the sand-dunes disclosed another series of plants. There was the familiar and characteristic Sea Sand Reed (*Ammophila*); and three woody plants

of very similar habit trailed in graceful prostrate sprays over the shifting sands. These were two Junipers; *J. communis*, var. *Canadensis*, and *J. Sabina* var. *procumbens*, and the Crowberry (*Empetrum*). With them in the dry sand were *Hudsonia tomentosa; Rosa lucida*, var.; *Vaccinium Vitis-Idaea; Arctostaphylos*, and *Smilacina stellata*, — names, many of them, more suggestive of the mountains than of the seashore.

Senecio sylvaticus was common, especially along the shores. Its handsome relative, the Tansy Ragwort, or "Stinking Willie" as it is called in Scotland (*Senecio Jacobaea*, L.), is now vigorously asserting itself here and traveling rapidly and extensively southward through the Maritime Provinces. Yet in the Synoptical Flora, in 1884, it is dismissed in a single line, as "with some other species, occasionally occurring as ballast waifs." I had seen and collected the bright golden flowers about the railroad stations as I came through New Brunswick, but I learned later that, like many a fine looking fellow, his reputation is very bad. The charges against the plant as stated by Mr. Lawrence W. Watson, a botanist of Charlottetown, in an article contributed by him to a local publication, and entitled "Wolves in Sheep's Clothing," are briefly that, as a pernicious and aggressive weed, it is an enemy to the farmer; second, that it is largely responsible for asthma and hay fever; and finally that it was the cause of a fatal epidemic which recently prevailed extensively among the cattle of Pictou County, Nova Scotia. With reference to the last charge there was, I think, an official investigation, but the evidence of guilt was not clear. So I was pleased, considering its good looks and our short acquaintance, to discredit these reports, and aquit it of all but the ordinary vices of a vagrant weed.

Two other introduced plants quite new to me, both also with weedy tendencies, were frequent about Tracadie. One, *Mentha rubra*, Hudson, is very similar to our only native Mint, *M. Canadensis*, L.; but the flowers are larger and reddish-pink, and there are other distinctions in the character of the pubescence and the leaves. The plant is handsome and readily distinguished in the field. The other plant, *Gnaphalium sylvaticum*, one of the Everlastings, grew about the edges of cultivated fields and roadsides. This weed seems not only to thrive under cultivation, but to improve, in appearance at least, under the severe and often destructive processes of the botanist. Like all the Everlastings, it adapts itself readily to pressing, drying, poison-

ing and mounting; and makes perfect and enduring specimens. As it was only recently discovered this side of the border, in Maine, it has not been admitted to the Manual.

Perhaps I ought to express the hope that my readers will not assume, in view of the excessive attention thus far lavished here upon the mere weeds, that the Island was altogether "an unweeded garden, that grows to seed." There was many a little untamed bog, or copse, or shore, which well repaid search for the plants which belong there; the shy natives in their own proper homes; and my collections included many such species. Brief mention of two only of these, which had also the charm of novelty, must suffice.

The Dwarf Mistletoe (*Arceuthobium pusillum*) has become well known only within comparatively few years, and though it is probably widely distributed, yet it is still sufficiently rare or local to compel attention to each newly discovered station. So I was pleased and perhaps pleasantly excited when I discovered the tiny parasite growing in abundance on the Black Spruce, in a sphagnum bog just behind the broad sandy beach at Tracadie. Its history, appearance, habits and distribution were so fully discussed in this Journal (Vol. II, pp. 1 to 11, and p. 221,) that but little beyond this record of its occurrence here need be given. It should be said however that, while the White Spruce and the Larch were both abundant in the neighborhood, yet I did not find the Mistletoe upon them. I was also impressed with the almost constant association, upon the same tree, of the Mistletoe with *Peridermium abietinum*, the fungus referred to by Prof. Arthur (RHODORA, II, 223); and the yellow sprays of the spruce, with leaves infested and discolored by the fungus, were the surest guides to the colonies of the flowering parasite upon the branches. I find no definite record of the occurrence anywhere in Canada of the Dwarf Mistletoe.

The second native and notable plant was a *Tillaea*, which I found in the wet sandy margin of Campbell's Pond, which is separated from the ocean by the same broad beach at Tracadie. Though the station was far north of its known range, it was of course assumed to be *Tillaea simplex*, and it was only after careful examination since my return, that Mr. Fernald identified it with *T. Vaillantii*, Willd., of Africa and Central Europe. The little plant, less than an inch high, grows in moss-like tufts like its congener *T. aquatica*, L. (*T. simplex*, Nutt.), from which it differs principally in the elongated pedicels of

some of the flowers. This species has not been reported from North America; but the "*Tillaea simplex*" mentioned in Mr. J. M. Macoun's Contributions to Canadian Botany[1] as "new to Canada," and collected also on Prince Edward Island, may be *T. Vaillantii*.

August sixth, the last day of my stay, I was joined by Mr. Watson from Charlottetown; and we rambled and collected together, enjoying the companionship and alike intent upon a wholesome and congenial pursuit. Thus pleasantly ended last summer's pleasant sojourn in a pleasant country! The warnings that were given to deter us were indeed verified, that the island was a garden; but it was also demonstrated that this garden contains many beds of flowers and many species which the gardener does not know are there, and which may well attract other botanists, as they did me, to the delightful summer observation and collection of them, and the critical and reminiscent winter study that follows of their forms and habits, their places, and their names.

NOTES ON THE FLORA OF CONNECTICUT.

A. W. DRIGGS.

In looking over the pages of Mr. Bishop's recent list of Connecticut plants, I find several I have reported in years past that need correction, and some additions that may be worthy of note at this time.

Botrychium lanceolatum, Angstroem (West Hartford) proves to be *B. matricariaefolium*, Braun, as noted in RHODORA, iii. 36.

Onoclea sensibilis, L., forma *obtusilobata* is noticeable to a considerable extent throughout the northern part of the state. It seems to be frequent in pastures, along roadsides where cattle have occasionally grazed, and I have found it about railroad embankments where bushes have been cut.

Woodwardia angustifolia, Smith, reported from East Hartford in the list of 1895, was stricken out in the Additions and Corrections as I was unable to verify the report. It has since been discovered in low woods in the central part of the town. This station is some fifty miles inland. *Lygodium palmatum*, Swtz. also finds its home here.

[1] No. V, p. 11. Reprinted from the Canadian Record of Science; Jan., 1895.

Juniperus Sabina, var. *procumbens*, Pursh. (Hartford, Manchester). Originally planted, now evidently growing without cultivation. The same may be said of *Thuya occidentalis*, L. (East Hartford). Aside from the fact that they grow without cultivation they can hardly be considered a part of our general flora.

Zizia aurea, Koch. var. *obtusifolia*, Bissell, RHODORA, ii. 225, has been collected in quantity from Canaan and So. Windsor.

Lactuca hirsuta, Muhl. Canton, August 14, 1901, along the main road, northern border of Mt. Horr. The species seems to be rare or at least only occasional. This, a single specimen, is the only one I have seen from the central part of the state during the past five years.

Prenanthes trifoliolata, Fernald, is being recognized more or less throughout the state. Along the main road from Granby to Simsbury it is noticeable.

Cassia Chamaecrista, L. Frequent and often common in towns along the coast, it is noticeably less frequent in the interior of the state. In the Connecticut valley it is well established and plentiful as far northward as Middletown, rather sparingly in Cromwell, Rocky Hill, and South Glastonbury. At Hartford I have seen one colony of few plants.

Desmodium Canadense, DC., throughout the central and northern portions of the state is an abundant and prolific wayside plant. I have seen it by the wayside in woods, but very sparingly, rather appearing as though it were not in its right habitat. In Connecticut it certainly has its most striking and handsome growth in strictly open places, preferring dry soil and the *wayside*. I always associate *D. Canadense* with such environment.

Desmodium canescens, DC., is more frequent than *D. cuspidatum*, T. & G., growing in abundance about the tobacco fields throughout the Connecticut valley and adjacent hill towns.

Carex intumescens, Rudge, although listed from but two stations is well distributed in the Connecticut valley.

Carex Muhlenbergii, var. *enervis*, Boott. Stamford, July 24, 1901. Not before reported from the State. Is plentiful along a path leading to the point of land south of the electric light station. Southern New York has been the northern limit according to Britton and Brown.

Carex mirabilis, Dewey. Reported from Meriden and Bridgeport. Large quantities were found on the Talcott Mt. Range, town of West Hartford, July 24, 1901.

Solidago Elliottii, T. & G. (Glastonbury). There is little doubt that this was a wrong identification. I recorded this species in my note book of 1894, but successive yearly journeys over the same ground (peat bogs along Salmon Brook) failed to yield further plants. I have persisted in my search, however, and was rewarded this year with *S. uliginosa*, Nutt., which has not been recorded before from this part of the state.

Pyrus arbutifolia, var. *melanocarpa*, Hook., is found in most of our swamp margins and low woods. That this is a plant not requiring moisture or soil such as is usually associated with it, may be seen from the following:— On the summit of Mt. Riga, Salisbury, growing on thin soil without much apparent moisture, plants were found on August 28, 1901, thriving and fruiting in abundance. They were unusually small, often not over three inches high, but bushy and stout of growth. The fruit did not show that it lacked the nourishment of a meadow soil or loam, being of good size and looking large on such small plants. Mt. Riga is over two thousand feet above sea level, has an exposed summit, portions of which are covered with grasses, also *Potentilla tridentata* and *Quercus ilicifolia*, the latter forming a sort of ring around the flat rocks of the summit, but not tall or plentiful enough to offer shelter to other plant life from the extremes of temperature. The day I was there the soil was almost caked, owing to the radiating heat from the rocks.

Panicum longifolium, Torr. Canton, August 14, 1901, vicinity of Mt. Horr. Previously reported in RHODORA iii. 102, from Rhode Island and in i. 67, from Connecticut. The Canton station extends its range well to the north so that the plant may be expected in almost any part of the state.

Panicum unciphyllum, Trin. Omitted in the lists but frequent in all open dry fields of the northern part of the state.

Panicum lanuginosum, Ell. North Bloomfield, August 2, 1901; open field south of the railroad cut; abundant. In the field it so resembled *P. unciphyllum*, Trin., that I did not recognize the specific difference; yet when pressed and mounted the semblance was decidedly different.

Panicum dichotomum, L. Pomfret, July 4, 1901; wood path to the Wolf Den and vicinity; frequent.

Panicum macrocarpon, Le Conte. Frequent throughout the northern portions of the state.

Panicum microcarpon, Muhl., I have not seen from the state. It is mentioned in the list as " (frequent) — Driggs."

Panicum sphaerocarpon, Ell. North Bloomfield, August 2, 1901; open field south of the railroad cut; abundant.

Eragrostis major, Host, — a form. New Haven, July 21, 1901; plentiful and noticeable.

Eragrostis reptans, Nees. Cromwell, August 19, 1901; pure sand, shores of the Connecticut river; plentiful.

Eragrostis Purshii, Schrader. North Bloomfield, August 2, 1901; open dry field south of the railroad cut.

Glyceria elongata, Trin. Canton, August 14, 1901; mountain woods about Mt. Horr., few plants.

Poa debilis, Torr. Pomfret, July 4, 1901; Wolf Den vicinity; local as far as observed. Listed from but one other place in the state.

Agrostis intermedia, Scribn. South Windsor, September 24, 1901; dry open woodlands along the southern border of the town.

Festuca tenella, Willd., *Asplenium acrostichoides*, Sw., and *Viola ovata*, Nutt. do not appear in the list, but are a part of our general flora.

Sagittaria rigida, Pursh, is abundant in wet sand along the shores of the power house pond at Tariffville.

East Hartford, Connecticut.

[*Carex Muhlenbergii*, var. *enervis*, reported by Mr. Driggs from Stamford, is a rather frequent form of the species in the southern portions of Connectutic, Rhode Island and Massachusetts — Ed.]

Early Records of Leontodon in America. — In a recent note on the "fall dandelions" of North America (Rhodora, iii. 293) I made the statement that *Leontodon autumnalis* was apparently first recorded as an established plant hereabouts in the 4th edition of Gray's Manual. Mr. T. O. Fuller has kindly called my attention to the fact that the plant was recorded not only in the 1st edition of the Manual (1848) but that by both Bigelow and Pursh it was reported as early as 1814. By what peculiar influence I was led to overlook these definite reports in standard floras and to fix upon the 4th edition of the Manual as the starting point of our records I am now unable to recall. There is, however, no question that the *Apargia autumnalis* of Bigelow and of Pursh is exactly the *Leontodon autumnalis*, L. Bigelow in the 1st edition of Florula Bostoniensis said "This plant, probably an emigrant from Europe, has over-run the vicinity of this

place, and grows in almost every kind of soil. It begins flowering in June and July, and is nearly the last plant that yields to the frosts of November," while Pursh in the same year reported the plant "In pastures on roadsides: New England." Since Pursh's explorations in America were carried on between 1799 and 1811 it is probable that the plant had become introduced very early in the last century. Michaux apparently did not mention the plant in 1803 and in Manasseh Cutler's Account of some of the vegetable productions of this region, published in 1785, there is no mention of any plant which seems satisfactorily referable to *Leontodon autumnalis*.— M. L. FERNALD.

LONICERA SEMPERVIRENS ESTABLISHED IN WESTFORD, MASSACHUSETTS. — About the first of October it was reported to me that the Trumpet Honeysuckle was growing wild in the south part of the town of Westford. I have been to see the place, and found in a pasture on the Amos Leighton farm three spots where the plant was growing on the eastern slope of the pasture, among berry bushes, sweet fern, blackberry vines, etc. At the first station the Lonicera was abundant and covered a space 15 feet in diameter. At the second there were only a few roots under a walnut tree. Miss Leighton told me she had only seen one blossom here, and that one was white. The third station had five or six strong plants. All the stations were within a quarter of a mile or less from each other, and all a half a mile from the farm house. As I do not find that this Lonicera has been reported from many towns in Middlesex County, its occurrence at Westford may be a matter of interest. — EMILY F. FLETCHER, Westford, Massachusetts.

THE Handbook of the Trees of New England [1] is a real handbook which will be heartily welcomed by every one who knows or cares to know anything about our trees. Although treating primarily the trees of New England, the book is practically as useful throughout the Northern States and Canada, for it is only an exceptional tree of the North which does not occur within the New England States.

[1] Handbook of the Trees of New England, with Ranges throughout the United States and Canada, by Lorin L. Dame, S. D. and Henry Brooks. Plates from original Drawings by Elizabeth Gleason Bigelow. Boston, Ginn & Company, 1902. Trade edition (cover with gold lettering), $1.50; school edition (black lettering), $1.25.

The narrow pages and cover, and the very clear drawings of branches showing leaves, flower, fruit, winter buds, and all the parts wished for comparison of different species, immediately commend the book for practical use both at home and in the field where it may easily be carried in the pocket.

Eighty-seven species and varieties are figured in full-page plates, and the text accompanying the plates shows much thought in the planning and a vast amount of detailed work in the organizing of notes. The treatment of each species is divided into seven paragraphs discussing separately the Habitat and Range, Habit, Bark, Winter Buds and Leaves, Inflorescence, Fruit, and Horticultural Value.

From a botanist's point of view the first paragraph of each treatment is perhaps most interesting, though all the sections contain points of value. But in the statements of range in New England of the different species we have the most accurate record of distribution yet available, and one based upon the careful observations, not only of the authors, but of many of the most alert botanists of this area who have coöperated very generally with the authors to perfect this portion of the work.

The descriptive paragraphs are very detailed and helpful, yet, in this as in many other books of the present day, one wishes that the leading or diagnostic characters might be emphasized either by italics or by some other device to distinguish them quickly from the purely generic or more trivial matters in the descriptions. In the present book, however, neither this uniformity of type in the descriptions nor the lack of an analytical key are serious hindrances to the practical use of the book. The excellent plates are a sufficient guide to the species, and these may be hastily glanced through with little inconvenience.

The discussion and illustration of species are followed by a glossary, and that by an index to both scientific and colloquial names so thoroughly provided with cross-references as to delight its most exacting user. The sequence of orders followed, it is almost needless to state, is that of Engler & Prantl, while the nomenclature is intelligently conservative. Altogether the book is one to be cordially recommended to all lovers of forests and out-door life, and the authors and publishers are to be congratulated on producing in such convenient form a book which fills so important and unique a place among New England botanical publications.

UTRICULARIA MINOR IN HOLBROOK, MASSACHUSETTS.

Alice G. Clark.

In the spring of 1898 *Utricularia minor* was found in a small area of meadow-land in Holbrook, Massachusetts. Several specimens were collected at that time and some also in 1899, but although careful search has been made the plant has not been found since.

This Utricularia is one of the most delicate of the genus. None of the plants found reached a height of more than 2.5 inches. The thread-like stems lay flat upon the ground and were hidden in the Sphagnum. The flowers, borne upon slender erect scapes, are very small, being about as large as the flower buds of *Drosera intermedia*, with which the Utricularia grew. The latter was in full bloom even in the shade, while the flowers of Drosera were not yet expanded, and the resemblance of the two plants was so strong that in walking along one found considerable difficulty in distinguishing them.

A specimen was recently sent to Mr. Emile F. Williams, whose reply I quote in part: "Utricularia minor has been one of my desiderata for some years. I did not realize it flowered so early. Your date is May 25. It was reported years ago from Tewksbury, but has not been seen by any one of late years and botanists were beginning to be very sceptical about it in this part of the country."

A note as to the growing conditions of the plant might be of assistance to anyone who should wish to look for it next spring. It is described in Gray's Manual as growing in shallow water, but I have found that during the past two years, when water stood an inch or two deep over this spot in the meadow, no trace of Utricularia could be found. During the preceding two years the seasons had been rather dry so that the meadow in this place was covered with a boggy growth of Sphagnum. There were scattered cranberry vines, *Vaccinium macrocarpon*, also *Drosera rotundifolia* and *D. intermedia*, and the green buds of *Pogonia ophioglossoides*.

Several readers of Rhodora would be interested to know if anyone else has collected *Utricularia minor* recently, and if so under what conditions.

North Easton, Massachusetts.

Vol. 4. No. 37, including pages 1 to 22, was issued 17 January, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 March, 1902 No. 39

IVY POISONING AND ITS TREATMENT.

Franz Pfaff, M. D. Ph. D.

Of all the cutaneous eruptions caused by poisoning plants, those produced by poison ivy and by poison sumach are probably the most common in this country.

It is the general belief of the public and of most physicians, that the eczematous conditions, which occur in many persons after handling such plants may be caused also by emanations from the plant, the active principle being thought to be a volatile substance.

The two attempts to isolate the active principle failed. One of the investigators, J. Khittel, attributed the action of poison ivy to a volatile alkaloid, the other, John M. Maisch, denied it, stating that a volatile acid, which he called "toxicodendric acid" is the active principle.

Both statements proved to be erroneous, as experiments, which I made a few years ago, have shown.

The lack of any rational treatment of ivy poisoning may be ascribed to the imperfect knowledge of the cause of this disease.

In my researches (v. Journal of Exper. Med. Vol. II. No. II. 97.) I used different parts of the plants, gathered at different seasons of the year and found, that the so-called "toxicodendric acid," which Maisch did not produce in the chemically pure state, is nothing but acetic acid and therefore not the cause of the eruption peculiar to ivy poisoning.

Further investigations showed that the active principle is an oil, which I named "Toxicodendrol" and which can be found in all parts of the plants, both in *Rhus toxicodendron* and *Rhus venenata*. This oil is easily soluble in alcohol, ether, chloroform, etc., but is insoluble in water. Toxicodendrol is easily decomposed by heat, but

very slowly at ordinary temperatures. A sample of it, which had been kept in an open porcelain dish for over 13 months, was partly converted into resin, but the remaining oil proved to be just as active as before. The active oil was also prepared from plants collected during the winter after having been covered with snow for weeks and from dry stems and branches which had been kept in the laboratory for over a year.

To test the strength of the "Toxicodendrol" I made many experiments and found the oil active in the minutest quantities; in one case as little as $\frac{1}{1000}$ mg. of the oil dissolved in 2 drops of olive oil proved effective.

The time of incubation varied from 18 hours to 9 days. This long period of incubation and the stability of the oil explain the belief, that direct contact is not necessary to contract the disease. When the first symptoms appear, several days have usually passed and a person may then not remember having come in contact with the plant. On the other hand some of the oil may stick to the clothing etc. and this may cause the disease even after several months have elapsed. In making these experiments I handled more than 25 kg. of the plants, and several hundred persons passed through the laboratory, where these experiments were made, but not one of those who did not come in direct contact with the plants or the free oil was poisoned.

It seems possible that poisoning might be caused by small particles of the plant, such as pollen and the hairs from the leaves, being carried through space by the wind and thus brought in contact with the skin or clothing, for as above stated, the oil is contained in all parts of the plant and even the hairs of the leaves may be seen under the microscope to contain oil.

Having defined the properties of "Toxicodendrol" we may now outline the rational treatment of ivy poisoning. As we have seen Toxicodendrol is not a volatile oil, but on the contrary is very stable, we must endeavor to remove it as quickly as possible and prevent its spreading.

This can be done by vigorously washing the affected and exposed parts with soap and water and a scrubbing brush; that is to say by mechanically removing the oil. As the active principle is very soluble in alcohol and gives with lead acetate a precipitate which is nearly insoluble in alcohol, other processes may be employed to remove the oil. The exposed parts may be washed repeatedly with

fresh quantities of alcohol and a scrubbing brush. The poisonous oil may be thus removed in alcoholic solution. Another way of proceeding would be to wash the exposed parts with an alcoholic solution of lead acetate; in this case the poisonous principle would be first transformed in its insoluble lead compound and then washed away with alcohol.

The washing must be done thoroughly when alcohol is employed, as otherwise the alcohol might only serve to distribute the oil more widely over the skin. The finger nails should be cut short and also perfectly cleaned with the scrubbing brush. Oily preparations, or anything which dissolves the poisonous oil, if used, should be immediately removed, as they may only spread the poison, giving it a larger area on which to work.

The treatment above outlined can not cure the already inflamed parts which must heal by the usual process of repair, but it does prevent the spreading of the inflammation and may serve to remove the poison before it has had time to produce its characteristic effects upon the skin.

Harvard Medical School, Boston.

NOTES ON SPOROBOLUS.[1]

Elmer D. Merrill.

Sporobolus depauperatus (Torr.) Scribn. Bull. Torr. Bot. Club. **10**: 63. 1883.

Vilfa squarrosa Trin. Agrost. **1**: 78. 1840.

Vilfa depauperata Torr. in Hook. Fl. Bor. Am. **2**: 257. *t. 236.* 1840.

There has been little confusion regarding this species owing to the fact that Hooker's excellent plate leaves no doubt as to the identity of the species. In the field this species is very distinct and at once recognized by its densely tufted habit, and prostrate culms which are seldom 1 dm. high, and much stouter than in *Sporobolus richardsonii.*

The type locality of *Vilfa depauperata* is "Hab. N. W. America,

[1] See also Nash, Bull. Torr. Bot. Club, **22**: 464, 465, Bot. Gaz. **21**: 155; Scribner, Bot. Gaz. **21**: 14, 15.

barren sandy parts of the Columbia from Menzies' Island upward. Douglas"; that of *Vilfa squarrosa* is "America septentr. in Ins. Menzies (Hooker)." Both *Vilfa depauperata* and *V. squarrosa* were published during the same year and evidently based on the same material and as it is impossible to determine which species has the priority of publication Hooker's name has been retained, as it is the one now in use by American botanists.

The range of this species is in dry open, often alkaline soils, from Montana to New Mexico, west to California and Washington.

Sporobolus depauperatus (?) Scribn. Bull. Torr. Bot. Club, 9: 103. 1882, is *Muhlenbergia dumosa* Scribn.

SPOROBOLUS **richardsonii** (Trin.) n. comb.

Vilfa richardsonis Trin. Agrost. 1: 81. 1840.

Muhlenbergia aspericaulis Nees, l. c., as syn.

Sporobolus aspericaulis Scribn. Bot. Gaz. 21: 15. 1896.

Sporobolus depauperatus filiformis Beal, Grasses N. A. 2: 296. 1896.

Sporobolus brevifolius Nash, Bull. Torr. Bot. Club, 22: 464. 1895; Britt. & Br. Illus. Fl. 1: 153. *fig. 346.* 1896; Ryd. Mem. N. Y. Bot. Gard. 1: 28. 1900; Britton, Manual 105. 1901, not *Agrostis brevifolia* Nutt.

There has been much confusion regarding this form and various authors have expressed differing opinions regarding it. From a careful study of synonymy, descriptions of species and specimens, and examination of spikelets from Trinius' type of *Vilfa richardsonis* from the herbarium of the St. Petersburg Academy, I have come to the conclusion that Trinius' name is the earliest available one for this form which is a valid species, although presenting forms which intergrade with *Sporobolus depauperatus* (Torr.) Scribn. It is recognized by its scarcely tufted habit, erect slender culms which are much taller than in *Sporobolus depauperatus* and never prostrate as in that species, and which are minutely but distinctly punctate, and in its somewhat longer, more acute spikelets.

The type locality of *Vilfa richardsonis* Trin. is "Amer. boreal. (Richardson)."

The distribution of this species is in meadows, river bottoms, etc., from Anticosti Island and Maine to British Columbia, south to Nebraska, New Mexico, and California.

SPOROBOLUS BREVIFOLIUS (Nutt.) Scribn. Mem. Torr. Bot. Club, **5**: 39. 1893.

Agrostis brevifolia Nutt. Gen. **1**: 48. 1818.

Vilfa cuspidata Torr. in Hook. Fl. Bor. Am. **2**: 238. 1840.

Vilfa gracilis Trin. Agrost. **1**: 82. 1840, not *V. gracilis* Trin. l. c. 52.

Sporobolus cuspidatus Scribn. Bull. Torr. Bot. Club, **10**: 63. 1883.

There has been much confusion regarding the synonymy of this species owing to the fact that there was some uncertainty as to the identity of *Agrostis brevifolia* Nutt. Through the courtesy of Mr. Stewardson Brown, curator of the Botanical Section of the Philadelphia Academy of Natural Sciences, I have been able to examine Nuttall's type of *Agrostis brevifolia* and find it to be identical with *Vilfa cuspidata* Torr., which being a later name becomes a synonym of *Sporobolus brevifolius* (Nutt.) Scribn. *Sporobolus brevifolius* Nash, Bull. Torr. Bot. Club. **22**: 464. 1895, is *Sporobolus richardsonii.*

The type locality of *Agrostis brevifolia* Nutt. is "Hab. In sterile naked plains and argillaceous soils, near Fort Mandan on the Missouri"; that of *Vilfa cuspidata* is "Hab. Banks of the Saskatchawan, near the Rocky Mountains, Drummond, Plains of the Red River, Douglas"; while that of *Vilfa gracilis* Trin. is "Amer. Boreal.? (Hooker)." There is in the U. S. National Herbarium a portion of Trinius's specimen of *Vilfa gracilis* from the herbarium of the St. Petersburg Academy, which is certainly the same as Nuttall's *Agrostis brevifolia.*

The range of this species is in dry open soils from Wisconsin, Iowa, and Nebraska, west to Nevada and Montana.

SPOROBOLUS FILIFORMIS (Thurb.) Rydb. Contr. U. S. Nat. Herb. **3**: 189. 1895; Scribn. U. S. Dept. Agr. Div. Agros. Bull. **17**: 173. *fig. 469.* 1899.

Vilfa depauperata filiformis Thurb. in U. S. Geol. Explor. 40th Par. **5**: 376. 1871.

Vilfa gracillima Thurb. in S. Wats. Bot. Calif. **2**: 268. 1880.

Sporobolus gracillimus Vasey, Descr. Cat. 44. 1885.

This species is fairly distinct, presenting intergrading forms with *Sporobolus simplex* Scribn., in general, however, being distinguished by its more slender, taller culms and mostly awnless spikelets. Its

range is on sandy shores, light, moist or rather dry soils, etc., from Nebraska and South Dakota to California and Washington.

SPOROBOLUS SIMPLEX **thermale** var. nov. A rather robust annual 2.5 to 3 dm. high, with numerous, short plane leaves about 2 mm. wide, and purplish, exserted, rather densely flowered, almost spikelike panicles 2.5 to 4 cm. long, 3 to 4 mm. in diameter. Spikelets 2 mm. long, the flowering glume scabrous, acute, mostly awnless.

Type specimen collected on the margin of a stream of hot water, Lolo Hot Springs, Montana, 302a David Griffiths, Sept. 17, 1898. No. 302 Griffiths, same locality and date, is also referred here.

This variety could with equal propriety be referred to *Sporobolus filiformis* (Thurb.) Rydb., but is distinguished from both *Sporobolus filiformis* and *S. simplex* by its more robust habit, and densely flowered panicles. In its awnless flowering glumes it approaches nearer the former although in general aspect it resembles *Sporobolus simplex*, but lacks the awned flowering glumes of that species.

SPOROBOLUS ARISTATUS Rydb. Bull. Torr. Bot. Club. **28**: 266. 1901.

In his description of this species Dr. Rydberg cites three specimens, 2196 and 27 Tweedy from Wyoming, and 1281 S. Watson from Utah. We have had access to the two latter numbers and after a most minute examination of those specimens we have been unable to distinguish this species from *Sporobolus simplex* Scribn. and must consider it only a depauperate form of that species. The presence of an awn to the flowering glume is an exceedingly variable character, and even in the type of *Vilfa depauperata filiformis* Thurb. (*Sporobolus filiformis* Rydb.) awned and unawned spikelets are found on the same plant.

SPOROBOLUS **gracilis** (Trin.) n. comb.

Vilfa gracilis Trin. Agrost. **1**: 52. 1840; not Trin. l. c., 82.

Vilfa subsetacea Trin. l. c., Arabic 111.

Agrostis juncea Michx. Fl. Bor. Am. **1**: 52. 1803, not Lam. Encycl. **1**: 60. 1783.

Heleochloa juncea Beauv. Agrost. 24. 1812.

Colpodium junceum Trin. in Spreng. Neue. Entd. **2**: 37. 1821.

Sporobolus junceus Kunth, Rev. Gram. **1**: 68. 1835.

Sporobolus ejuncidus Nash in Britt. Manual 106. 1901.

There are in the U. S. National Herbarium spikelets from Trinius's type of *Vilfa gracilis* from the St. Petersburg Academy, the type locality of which is "Carolina." It is very evident from examination of these

spikelets and Trinius's description that his *Vilfa gracilis* is identical with *Agrostis juncea* of Michaux, although on the following page of the same work Trinius considers *Vilfa juncea* (Michx.) as a distinct species, evidently, however, basing his description mainly on South American material which was probably not the true *Agrostis juncea* of Michaux. Through an error Trinius published a second species of *Vilfa* under the specific name *gracilis* in the same work, page 82, which, however, is a synonym of *Sporobolus brevifolius* (Nutt.) Scribn. In indexing this volume Trinius discovered his error and applied a new name *Vilfa subsetacea*, page 111, to his first *Vilfa gracilis* rather than to the second and hence *Vilfa subsetacea* becomes a synonym of *Sporobolus gracilis.* In Britton's Manual Mr. Nash applied the name *Sporobolus ejuncidus* to this species, owing to the fact that the name *Sporobolus junceus* was untenable because Michaux's original publication of the species sub *Agrostis*, was antedated by *Agrostis junceus* Lam. According to the above note this name becomes a synonym, as the species already had two available names, *Vilfa gracilis* and *Vilfa subsetacea.*

Washington, D. C.

MISCELLANEOUS NOTES ON NEW ENGLAND FERNS, — IV.

George E. Davenport.

Note 7. The Evergreen Ferns of New England.— A winter study. This note is intended as a guide to the study of those ferns which remain green, or nearly so, through the winter and early spring, when the frequently occurring intervals of mild weather afford numerous opportunities for studying them to advantage.

With the disappearance of the late autumn foliage from the hills and woodlands, the rocky ledges stand out in bolder relief, exposing to view the great masses of polypody that fringe the boulders with their dark green fronds; the marginal shield ferns that crouch low at their bases for shelter, and the tiny spleenworts that have been hiding away securely in the crevices of the cliffs through all the summer season. In the woodland swamps, when free from snow, the

prostrate forms of the large ferns are exposed to view, and then is a good time to study the crowns and crosiers.

Then too is a good time to search for abnormal forms of the polypody, which in England produces so many remarkable variations. Among the countless thousands of plants distributed throughout our New England woodlands one may well expect to find many interesting forms, which, while they might not be of any great importance from a taxonomic standpoint, would yet be of some interest biologically, and help to increase our knowledge of the causes for plant variation.

It may be objected to the treatment adopted in this study, that, being based largely on the character of the rootstock, it may lead to the extermination of rare ferns by the taking up of plants; but this need not necessarily follow. The rootstocks of nearly all of our ferns can be studied without disturbing them enough to retard their growth, and with proper precautionary instructions it will be found that those who realize the importance of protecting and preserving our native plants will be less liable to destroy them through this method than they would be through any other. Thus this method may even become a valuable medium for aiding in the preservation of rare plants.

Roughly grouping our New England Ferns by their most obvious characters for the convenience of a ready recognition we may separate them into two sections as follows:—

I. Evergreen, or partially so, at least as to the late sterile fronds. Fronds more or less persistent through the winter.

II. Not evergreen. Fronds withering away on the approach of winter.

These sections may each be subdivided into three divisions based on the nature of the rootstock in accordance with the following arrangement.

Division A.— Rootstock rhizomatose, *i. e.*, having the character of a rhizome — a running stem. Fronds more or less scattered; crosiers (frond-buds) usually isolated.

Division B.— Rootstock caudiciform, *i. e.*, short, stout, and having the form of a caudex. Fronds fasciculate, *i. e.*, clustered at the growing end. Here occur two forms namely: with the rootstock, in the one case, *erect*, or partially so, growth upright; and in the other, *decumbent*, growth lateral, extending horizontally.

Division C.— Rootstocks caespitose, *i. e.*, forming tufts or little bunches.

As this guide is intended especially for winter and early spring use, only the first section (with more or less evergreen fronds) will be considered here.

Under Division A (with rootstock rhizomatose) we have the following ferns: —

* Fronds climbing; rhizome long and slender; stipes and flexuose rachises twining on shrubbery in rather open woodlands.

1. Lygodium palmatum, Swartz. Climbing Fern. Sterile portion persistent, fertile portion perishing; pinnae palmately divided, or lobed. N. H., Mass., Ct.

* * Fronds not climbing, green all winter, stipes articulated to a moderately stout scaly rhizome.

2. Polypodium vulgare, Linnaeus. Common Polypody. Abundant on boulders, ledges and rocky hillsides. Me., N. H., Vt., Mass., R. I., Ct.

Obs.— Var. *cambricum* has been found in Connecticut (*Dr. Underwood*) and New Hampshire (*Mrs. F. G. Webster*), and some very interesting abnormal forms have been collected in Vermont by Miss Slosson.

Under division B (Rootstocks caudiciform). Plants large.

* Rootstock erect, or partially so, growth upright.

3. Nephrodium marginale, Richard (*Aspidium*, Swartz).— Marginal Shield-fern. Fronds once or twice pinnate, margins entire or crenate; sori marginal. Rocky hillsides with no. 2, ravines and swampy woodlands with 4, 5 and 6. Me., N. H., Vt., Mass., R. I., Ct.

One or two forms have been designated but appear to me little more than states of development.

4. Nephrodium cristatum × marginale, Davenport. Fronds resembling no. 3 in the upper portion, and no. 5 in the lower; lobes toothed more as in no. 5. Sori sub-marginal or medial. Found always with no. 3 and no. 5 between which it is a natural hybrid, as Miss Slosson has successfully demonstrated by raising it by artificial crossing from spores. Me., Vt., Mass., R. I., Ct.

Obs.— Under favorable conditions fertile fronds of nos. 3 and 4 remain green nearly all winter. It may be well to add, however, that, as is the case with nearly all of these ferns, both fertile and sterile fronds, when surviving, become flaccid in autumn and lie prostrate through the winter, becoming more or less discolored.

** Rootstock decumbent, growth lateral, extending horizontally.

5. Nephrodium cristatum, Richard (*Aspidium*, Swartz). Late sterile fronds remaining green all winter, fertile fronds withering gradually, long lanceolate with nearly triangular deeply pinnatifid pinnae, normally acute, or obtuse at the apex, but in var. *Clintonianum* long acuminate; lobes in both forms bluntly toothed; sori medial, or nearly so. Low swampy woodlands. Me., N. H., Vt., Mass., R. I., Ct.

Obs.— In var. *Clintonianum* the rootstock is much stouter, and the crowns are more loosely built up as it were, the crosiers overlapping one another irregularly much after the manner of the knuckles on a half closed hand. The large ovate and lanceolate scales with which the crosiers are clothed shade from light amber to dark brown in both forms, and on old fronds the rounded backs of the stipes shade to blackish brown.

An interesting form with apparently strictly herbaceous fertile fronds that perish altogether in early autumn has been collected in Vermont by Miss Margaret Slosson for several years, and may prove to be distinct; however as some sterile fronds on two or three plants of it that have been growing on my own grounds are still green at present writing (Feb. 5th), I am not ready to accord to it specific rank; I have, however, provisionally named it *Nephrodium cristatum*, Rich., var. **Slossonae**, n. var. Fully matured plants of this form are quite as large as, if not larger, and with broader fronds than *var. Clintonianum*; the texture is thinly herbaceous and the sori are arranged in a close costal series much as in *Nephrodium Goldieanum*, from which, however, it is wholly distinct. I shall have more to say about it at another time.

A conspicuous feature in all of the *cristatum* forms in winter is seen in the deeply sunken blackish grooves in the upper coriaceous surfaces, and the elevated lines beneath which mark the course of the venation.

6. Nephrodium Boottii, Davenport in Gilbert, Catl. 1901 (*Aspidium*, Tuckerman). Fertile fronds on my grounds at present

writing (Feb. 5th) brown and withered, but stipes partially standing; sterile fronds prostrate and green. Normal fronds broadest above the middle, resembling no. 5 below, and no. 7β above, the lobes more deeply toothed than in no. 5, and less sharply so than in no. 7β. Indusium when found finely glandular. Swamps with nos. 5 and 7, Me., N. H., Vt., Mass., R. I., Ct.

7. NEPHRODIUM SPINULOSUM Desvaux (*Aspidium* Swz.). Fronds with the divisions all *spinulosely* toothed, and more deeply cut than in other members of the group. Widely distributed in various situations, Me., N. H., Vt., Mass., R. I., Ct.

Many forms of this protean species have been found, but the following are all that appear worthy of permanent recognition.

α. Normal form.— Whole frond smooth, pinnae obliquely set to the main rachis, the lowermost pair shortest; sori terminal on the veinlets which terminate *within the radius of the fruit-dot* (*sorus*); indusia smooth; scales of the crosiers light brown.

β. Var. *intermedium*, Davenport. Divisions of the lamina more finely cut, pinnae spreading at right angles; *under surfaces and indusia finely glandular* especially along the darker rachises and midnerves; sori below the apex of the veinlet which extends beyond the radius of the fruit-dot; scales of the crosiers darker.

γ. Var. *dilatatum*, Baker. Nearly as in α, but much larger every way, the mountain forms being broadly triangular ovate; *sori* below the apex; scales on the crosiers dark with blackish centres on some of the largest forms.

Obs.—As is well known *Nephrodium dilatatum* is considered by English authors generally as being a wholly distinct species from *N. spinulosum*, and even Moore, who yet regarded *spinulosum* as a mere variety of *cristatum*, so treated it under *Lastrea*, describing several forms as varieties. His description of *var. tanacetifolia* "fronds ample, triangular or sub-triangular ovate, tri-quadri-pinnate; scales of the stipe dark-centred" (Native Printed Ferns 1, 225) exactly fits our mountain forms from New Hampshire and Vermont; but Moore's forms are all described as having *glandular indusia*, whereas in our form the indusium is smooth as in α.

8. POLYSTICHUM ACROSTICHOIDES, Schott (*Aspidium*, Swartz). Christmas Fern. Whole plant remaining green, or nearly so; fertile fronds contracted above the middle, the tips only perishing; pinnae auricled at the base, *spiny toothed*. Rocky hillsides and ravines, Me., N. H., Vt., Mass., R. I., Ct.

Obs.—As pointed out in my previous note (Rhodora, iv. 9) Polystichum is especially characterized by its densely opaque, or coriaceous texture, auricled pinnae and *aculeate* or *spiny* toothed lobes.

9. Polystichum aculeatum Swartz, var. Braunii Davenport (Rhodora, l. c.). Stipes and rachises thickly clothed with soft hairs and chaffy scales; crosiers densely covered with rich brown scales and chaff; margins of lobes aculeate. Mountain ravines, Me., N. H., Vt.

Under Division C (Rootstock caespitose). Plants small.

10. Pellaea atropurpurea, Link. Purple Cliff-Brake. Not strictly caespitose, but rhizomes short, moderately stout, and with the stipes so closely approximated as to appear tufted. Doubtfully evergreen with us unless in especially favorable situations. Miss Slosson writes me that she has found that it drops its pinnae in winter, "the stipes and rachises remaining." Needs further investigation and the winter season is a good time for it. Limestone cliffs, N. H., Vt., Mass., R. I., Ct.

11. Asplenium Trichomanes, Linnaeus. False Maiden-hair. Fronds all alike, narrowly linear, pinnate; stipes and rachises black, or purplish black, and shining. Rock crevices, Me., N. H., Vt., Mass., R. I., Ct.

12. Asplenium viride, Hudson. Green Spleenwort. Resembling no. 11, and in similar situations, but with stipes and rachises green. Vt.

13. Asplenium ebeneum, Ait. Ebony Spleenwort. Sterile fronds in rosette-like clusters at the base of the taller erect fertile fronds; stipes and rachises purplish black and shining, or in *var. Hortonae* — a sterile form with plumose fronds — reddish. With no. 11, Me., N. H., Vt., Mass., R. I., Ct.

14. Asplenium ebenoides, R. R. Scott. Fronds more or less distorted, and sometimes proliferous. A natural hybrid between nos. 13 and 17 with which it has always been found growing and to be looked for wherever those two ferns are plentiful in close proximity to one another. Vt. (*Eggleston, Woolson & Swift*), Ct. (*Adam*).

15. Asplenium montanum, Willdenow. Mountain Spleenwort. Fronds ovate-lanceolate and much incised. A comparatively recent addition to our New England fern-flora, and as yet little known. Limestone cliffs, Ct.

16. Asplenium Ruta-muraria, Linnaeus. Fronds deltoid, with wedge-shaped divisions, Limestone cliffs, N. H., Vt., Mass., Ct.

17. Camptosorus rhizophyllus, Link. Walking Leaf. Fronds undivided, with prolonged proliferous tips; abnormal forms not infrequent. Limestone cliffs, but also on other formations. Me., N. H., Vt., Mass., R. I., Ct.

This completes the evergreen true ferns of New England, but in old meadow lands, about hummocks and shrubbery, on springy hillsides, or in low woodlands, when free from snow, in many places may be found the ternate fleshy sterile forms of *Botrychium ternatum*. So also may be found the handsome furrowed stems of the scouring rush (*Equisetum hyemale* L.) and several forms of club moss (*Lycopodium*), and *Selaginella*.

Note. In the preparation of this matter I have been greatly indebted to Miss Slosson for many valuable observations which it gives me pleasure to acknowledge here.

Medford, Massachusetts.

OUR CHOKEBERRIES.

W. H. Blanchard.

The compilers of the Flora of Vermont could find no authenticated specimens of the Red Chokeberry, *Pyrus arbutifolia*, L., and so left it out, though the Black Chokeberry was given as common. On May 26, 1900, I found the Red Chokeberry on Rocky Hill in Westminster, Vermont, about two miles from the Connecticut River. While I felt sure I had found the typical plant and no variety or "form," I sent it to Pres. Brainerd and Mr. Fernald to have it compared with authenticated specimens. Both pronounced it a normal plant of the type form. So Vermont botanists can add another plant to our growing list.

Some of my observations on both of our Chokeberries are here given. They seem to indicate that these plants are variable in several respects and may interest botanists. The plants have an abundance of Latin names, some of them indicating that the color of the fruit has been considered to be practically uniform.

The Illustrated Flora describes the Red Chokeberry as from five

to twelve feet high; lower surfaces of the leaves, calyx and pedicels tomentose; fruit globose or depressed, bright red, two or three lines in diameter; growing in swamps and wet woods. Gray gives it as common from Nova Scotia to Florida. It grows at my Westminster station on dry, rocky knolls scattered over a large area of poor, broken woodland, but not in the swampy or moist places. The fruit was not fairly ripe and red till the middle of September, and later it turned black. It was much smaller than that of the Black Chokeberry, which grew here also, and six weeks later. It will be noticed that in Vermont it is not common and does not in this case grow in swamps and wet places.

I have watched it at a station in Walpole, New Hampshire, also. Here it grew in a moist place, but the fruit had only a mere tinge of red and that on only a small part of the berries. At both these stations the fruit was globose-depressed like an apple. But on September 21, 1901, I found a Walpole station on Drewsville Plain so often mentioned in Mr. Fernald's article in Rhodora, iii. 232. It was near "Aunt Philae's" pond, and the plants were from six to ten feet high, but the fruit was as large as that of the Black Chokeberry, elongated-globose like it and as black, plump and shining. I sent specimens to Mr. Fernald and he thought we must call them *P. arbutifolia*. At all three stations the woolly condition of the underside of the leaves, of the calyx and the pedicels was the same and continued throughout the season.

The Black Chokeberry is described in the Illustrated Flora as having the underside of the leaves, pedicels and calyx glabrous; fruit globose or oval, nearly black or purplish black, three or four lines in diameter; growing in swamps and low woods or sometimes in drier situations. Gray gives it as having black fruit, and Wood as growing in swamps, and from two to five feet high. I have seldom seen it in a swamp or wet place. It is often five or six feet high though generally it is shorter. It often grows with Huckleberries and is generally supposed or said to be poisonous. Some of its common names are expressive if not polite. I have not found it astringent as the floras give it, but flat and tasteless.

I found it very abundant in Stratton, Vt., on the historic ground where Daniel Webster addressed the famous gathering of the Whigs of Southern Vermont in 1840. Many specimens were bright-red but otherwise normal, and none grew in damp places.

On the coast of Maine, especially on the plains of Kennebunkport where boreal plants are so common, I found large areas of it mostly about a foot high. On August 8, 1901, I saw near the Town House large patches which had red and purple fruit. In a few days this had darkened a great deal and was wrinkled and dull, while the normal fruit was plump and shining. In all cases the leaves and pedicels were glabrous.

It is evident that these plants need much further study and I should be pleased to hear from others in regard to them.

WESTMINSTER, VERMONT.

NOTES ON LYCOPODIUM.

R. G. LEAVITT.

LYCOPODIUM CLAVATUM, VAR. MONOSTACHYON ON MT. MONADNOCK. — In driving through elevated pasture land on the outlying southern slopes of Mt. Monadnock, New Hampshire, in November, 1901, I was attracted by a growth of *Lycopodium clavatum* covering a plot of dry open ground 12 or 15 feet in diameter, and noticeable even at some little distance for its unusual appearance. The plant differed from ordinary *clavatum* in having an exceedingly stiff habit, the secondary shoots being shorter and more erect, the lateral segments of these shoots less divergent, and the leaves far less spreading than in the type. The later leaves of each season were closely appressed, the latest particularly so, and thus the annual growths of the branchlets being plainly marked off the plant had a conspicuously articulated appearance. I found in all 70 peduncles bearing in each case a single strobile.

Analogous forms of *L. complanatum* and *L. obscurum* are to be seen where these species occur in open, dry situations. In *complanatum* we get short, sparingly branched, more or less erect segments, and reduction in the number of strobiles to each peduncle; in the *obscurum*, similar effects on the general habit, with certain resultant changes in the plan of the lateral segments. These variations, which are often very pronounced, are due to physiological causes. On the contrary the characters distinguishing the form of *L. clavatum* in question seem to be constitutional. The specimens taken agree with plants from further north, of the variety *monostachyon*. This

variety was the subject of a note in Rhodora for September, 1901. Dr. B. L. Robinson, the writer, found var. *monostachyon* abundant along with the type in northern Aroostook County, Maine, and at Grand Falls, New Brunswick, and states that in some places it becomes the prevailing form. Its range is indicated by the localities and regions cited, — Prince Edward's Island, Katahdin, Alstead, N. H., Lake Winnipeg, and the Rocky Mountains of British North America.

The Gemmae of L. lucidulum. On a sloping rock partly covered with leaf mold I found 25 young plants of *L. lucidulum*, of various ages, derived from gemmae. I was interested in noting that some of these plantlets were 3 feet from the nearest adult growth of the species, and at a level one foot higher. How did the gemmae reach this distance and elevation? They are said by various writers to "fall" or to be "spontaneously loosened" from the parent stems. Some time later when I found *L. lucidulum* with the propagative buds undisturbed, I was able partly to answer the question. Pressing down gently at the extreme edge of the cotyledon-like leaf of one of the buds I broke the gemma off. It did not fall but snapped, and landed 11 inches away. The second flew 25 inches, the third an equal distance. It seems then, that elastic recoil from some source may throw the ripe gemmae a little distance when these bodies are struck, as by rabbits or birds or perhaps by rain drops. The shape of the bud, which is slightly concave above and is held out as it were like the hollowed hand, palm upwards, lends some degree of plausibility to the idea that drops of rain or the heavier drip from trees may be the usual means of loosening the gemmae. The range of the trajectory may be 3 or 4 feet, at the greatest. This, I take it, is about 40 times the annual advance by growth. The time taken for bud-derived plants to mature, before another saltus of this kind can occur, must very greatly reduce the relative gain in dissemination as effected solely by snapping of the gemmae; perhaps the ratio of gain may be 3 or 4.

Archangeli says that the gemma, or "bulbil," of *L. Selago* — very similar to that of *L. lucidulum* — falls off, and that, without any disarticulation by cellular disintegration, the tissues of the short pedicel bearing the bulbil are ruptured through the pressure of cushion-like swellings arising on the bases of the fleshy side leaves of the bulbil and jutting against the upper leaves of the pedicel. When the stress due to the growth of the swellings is greatest, a downward blow may convert the pressure into an efficient propulsive force.

LYCOPODIUM COMPLANATUM, VAR. FLABELLIFORME. — The main stem of *L. complanatum* is spoken of by Gray's Manual as "extensively creeping (often subterranean)." The *L. complanatum* of the Manual is the variety *flabelliforme*, Fernald. By my observation the main stem is very much oftener unbranched — the vertical secondaries aside — than branched. On the average of many plants examined, it divides less than once in five or six years. And I have never found it subterranean. It creeps onward in a single line, as a rule reaching forward annually a foot more or less, and always running over the surface unless by accident the tip meets an obstruction. If the way is barred the tip may make a detour and become for a short distance in a manner subterranean. Otherwise it lies upon the surface. The duration of the stem is five or six years; that is, the oldest part, which is about to be overtaken by decay, is five or six years old. Naturally in the course of so many years the stem often becomes covered with leaf mold. It does not, however, seek a subterranean path, so far as I have been able to find.

These points with regard to var. *flabelliforme* are of some value in determining the standing of the variety (?), or species (?), *chamaecyparissus*.

The number of strobiles to the peduncle I find very variable, according to local conditions. Strong light and dry soil tend to restrict the branching of the fruiting axes, and this effect is often marked. For example a plant collected without particular attention to the number of spikes proves to have the following strobilation.

Strobiles per peduncle	1	2	3	4
Cases found	3	9	2	0

The average number of strobiles is 1.9 —

At Jaffrey, New Hampshire, I gathered a good number of spikes from a variety of situations in order to obtain some idea of the tendency of the plant in that region in the matter of branching of the inflorescence (if we may so speak or the "fruiting" parts). The count shows such a degree of variation that one may probably conclude that the influence of soil, light, etc., is greater than that of geographical position. At least it indicates that it would be a very arduous task to make even an approximate determination of the general tendency in any district. Spikes gathered in an open fallow field, in moderately dry soil, where there was no shade, gave the following figures:

Strobiles per peduncle	1	2	3	4	5	6
Cases found	1	67	249	195	1	0

Prevalent number 3, average 3.25.

In low, rich woods the following results were obtained:

Strobiles per peduncle	1	2	3	4	5	6
Cases found	0	10	74	457	32	2

The fours predominate strongly; the average number is 3.9.

THE AMES BOTANICAL LABORATORY, North Easton, Massachusetts.

PLANTS NEW TO EASTERN MASSACHUSETTS.—On June 14, 1901, I found in a rocky path on the south side of one of the Blue Hills in Milton, several specimens of *Carex glaucodea*, Tuckerm. This plant has not before been reported east of Mt. Holyoke, Massachusetts, in the Connecticut Valley, when Tuckerman discovered it in June, 1865, in a similar rocky path on the south side of the mountain; from this point it has been found west and south to Illinois and Arkansas. July 9 I noticed near the roadside in Milton a new *Hieracium*, *H. vulgatum*, Fries. The plants were in abundance behind an old wall on land that had not been cultivated for twenty years or more and included specimens of very varying size from three to thirty-two inches high.

On Aug. 15, at Scituate, I saw a singular looking brown *Juncus* resembling *J. nodosus*, L., which I took to be *J. scirpoides*, Lam., but on examination it proved to be *J. brachycarpus*, Engelm. This quite southern species is reported in the February RHODORA as found near New London, Connecticut, the past season by Dr. Graves, both stations new to New England. At Scituate it grew on a gravelly ridge about a third of a mile from the ocean, and in a patch of peculiar reddish soil quite different from the general soil of the ridge. The gravel was in small equal sized particles with a peculiar greasy feeling to the hand; and neither the plant nor the soil were observed elsewhere.

As an explanation of one possible distribution of plants I have never seen any notice taken of the transportation of soil from any distant place to another locality; but some years ago while walking in Wareham, Massachusetts, I noticed a bit of fossil rock in the highway much like the stones on the Potomac shore near Mt. Vernon,

and certainly not like anything on Cape Cod. In answer to my inquiries I was informed that a few years before a Wareham schooner had brought back from Chesapeake Bay a ballast load of gravel which had been used on the sandy road at this part to make a better highway. Almost all gravel transportation is by railroad and for comparatively short distances, but when brought in schooner loads from a southern shore we may certainly expect new plants and animals to be concealed in it.— G. G. KENNEDY, Readville, Massachusetts.

SOME PLANTS OF INTERVALE, NEW HAMPSHIRE.— It may interest the readers of RHODORA to know that in August of the years 1889 and 1890 *Pogonia pendula* was found at Intervale, New Hampshire. It grew not very plentifully in two or three very limited areas under beech trees, often pushing up through the beech leaves and carrying them like an unwieldy collar at a little distance below the flowers. Since the years mentioned I have not been in Intervale during the month of August and have no means of knowing whether this orchid still grows there.

Along a railway cutting through a sand bank at Intervale, there is always to be found a quantity of *Polygonella articulata*,— a station unusually far inland and also marking perhaps the northern limit of this species in New England.

Hudsonia tomentosa grows plentifully among sand and pebbles in abandoned beds of the Saco along the road to Echo Lake, or in bottoms subject to overflow, and has increased noticeably in the last ten years. From the Gray Herbarium I learn that this is the Hudsonia secured at Intervale some years ago by Miss Susan Minns. Her plant was correctly determined as *H. tomentosa* by the late Dr. Sereno Watson and is so labeled in the Gray Herbarium, but by some clerical error it was recorded in the 6th edition of Gray's Manual as *H. ericoides* and this mistake was repeated in the Synoptical Flora.

I have also found *Paronychia argyrocoma* on sand bars of the Saco near Humphrey's Ledge at Intervale.— FRANCES C. PRINCE, Boston, Massachusetts.

THE "KING-DEVIL WEED" IN THE PENOBSCOT VALLEY. — I am not aware that *Hieracium praealtum* has been recorded from this part of Maine, and if not the following record may be of interest. On June

15, 1901, I found it growing commonly and in full blossom between Kenduskeag and Corinth. It was in fields and meadows and by the roadside. The plant must have been established in this locality for a number of years in order to have become so abundant. The common Orange Hawk-weed, *Hieracium aurantiacum*, was growing associated with the preceding and equally abundant. — O. W. Knight, Bangor, Maine.

[*H. praealtum*, characterized as the worst weed which has recently appeared in Maine, has destroyed many hayfields in the Kennebec Valley, where Mr. H. K. Morrell and others have made vigorous though usually vain attempts to arouse the farmers to their obligation to check its rapid encroachment. Its spread in the Penobscot Valley, where *H. aurantiacum*, the Orange Hawk-weed or "Devil's Paint-brush," is already a pest, should be scrupulously guarded against.— Ed.]

Cypripedium arietinum on Mt. Toby, Massachusetts. — In the list of New England plants published by Mr. E. T. Williams in the January number of Rhodora, *Cypripedium arietinum*, R. Br. has been omitted from the Massachusetts column, but it still grows on Mt. Toby where it was first reported by Clark as recorded in Tuckerman's Amherst Flora. I found the plant growing there in 1874; and apparently its numbers have not decreased from that day to this.

So far as I know, the only species that should now be stricken from Tuckerman's Amherst list is *Lysimachia punctata*, L. It grew in South Amherst near a roadside fence that has since been removed and the ground plowed up. Perhaps it now grows elsewhere in the Amherst region, but it is no longer found in the locality where it was first reported. — L. H. Elwell, Amherst, Massachusetts.

Liparis Loeselii in Massachusetts.—After the January issue of Rhodora had been mailed it was found that the plate of page 19 had been damaged during the press-work and that in all the later copies the plus sign, indicating in the tabular matter the occurrence of *Liparis Loeselii* in Massachusetts, was completely obliterated. The species is, of course, well known in Massachusetts, and was duly recorded for the state by Mr. Williams in his very full and critical list of our New England orchids.

The Josselyn Botanical Society of Maine, — Mid-winter Meeting. — The meeting of the Josselyn Botanical Society of Maine, held at the rooms of the Portland Society of Natural History,

December 28, 1901, was attended by many members and friends from different towns in the state. In the absence of the President, A. L. Lane, the meeting was called to order by Dr. Dana W. Fellows, chairman of the committee of arrangements, and Prof. Leslie A. Lee of Bowdoin College was made Chairman of the meeting.

During the afternoon four announced papers and many brief informal reports at roll-call were presented. Mr. Edward B. Chamberlain, of Vassalboro described in detail a large peat bog in Cumberland, discussing the ecological and physiological relations of the plants of the different belts of vegetation from the pond at the centre to the wooded margin of the bog. Miss Kate Furbish of Brunswick summarized much of the present knowledge of useful native plants of the State, and furthermore enumerated many species which are justly winning recognition as ornamental plants. Mr. Merritt L. Fernald of Cambridge, Massachusetts, exhibited about fifty of the recently discovered plants of Maine, calling attention to the specific peculiarities of the plants, and emphasizing the relation of these discoveries to our general understanding of laws of plant geography. Rev. B. P. Snow of Yarmouth discussed the functions and work of foliage.

After the announced papers there was a roll-call of members at which each responded by a brief note or by some suggestion or question. These responses contained much of interest to the members, that of Dr. D. W. Fellows being specially interesting to readers of RHODORA. Dr. Fellows has corresponded with Mr. Hall, formerly of Shapleigh, Maine, in regard to the occurrence of *Camptosorus rhizophyllus* in York County; and it is now established that the specimen of *Camptosorus* at the University of Maine, supposed to have been found at Shapleigh, grew in western Massachusetts. It is probable, also, that *Anemonella thalictroides*, reported on the authority of the same collection from Shapleigh, was not originally gathered in Maine.

In the evening Mr. Austin Carey, Forester for the Berlin Lumber Company, and formerly of the Maine Forestry Commission, gave an instructive and encouraging lecture on forestry, with especial reference to the conditions in Maine, though illustrated also by comparative scenes in the forests of the Pacific Slope, the Great Lake Region and the Black Forest of Germany.— DORA H. MOULTON, Secretary, Portland, Maine.

The Seventh Annual Winter Meeting of the Vermont Botanical Club held at the University of Vermont, Burlington, on the 24th and 25th of January, was the most successful of any in the history of the Club. More than fifty botanists were present, and fifteen names were added to the membership. The program included twenty-three papers, representing a wide range of taxonomic, morphological, physiological, and economic subjects. Among cryptogams thirteen species of mosses and seven of algae new to the State were listed. Mrs. Frances B. Horton reported finding *Dryopteris simulata* Dav. at Brattleboro', the first record for Vermont, and *Lygodium palmatum* Swartz only twelve miles distant in New Hampshire. A large number of flowering plants has been added to the local flora of Burlington, and sixty-four species new to the state have been reported since the publication of the Flora a little over a year ago. The problems of forestry aroused much interest, and the need of enlightenment in this field for the purpose of awakening general action and influencing legislation was emphasized. Nature study and the botanical work of secondary schools received attention in several papers. President Brainerd suggested as the chief problems for the next season the careful study of such critical groups as *Viola*, *Rubus* and *Crataegus*. The address by Professor B. L. Robinson on Some Recent Advances in the Classification of the Flowering Plants, in which an outline of the history of taxonomic systems was followed by a most lucid exposition of the Eichlerian principles as developed by Engler and Prantl, was listened to with great interest by a number of persons outside the ranks of working botanists as well as by the members of the Club. The officers were re-elected as follows: President Ezra Brainerd of Middlebury College, president; Mr. C. G. Pringle, vice-president; Professor L. R. Jones, secretary. The field meeting next summer will take the form of an excursion to the islands and shores of Lake Champlain. — T. E. Hazen.

Vol. 4, No. 38, including pages 23 to 42 was issued 10 February, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 April, 1902 No. 40

THE NEW ENGLAND POLYGONUMS OF THE SECTION AVICULARIA.

B. L. Robnison.

(Plate 35.)

It has long been known to several careful observers that our Polygonums of the Section *Avicularia* (Bird's Knotgrasses) still offer many perplexing problems. Even some of the commoner forms of this group fail to find recognition or adequate characterization in current manuals, and the section is rendered difficult alike by a general habital similarity, inconspicuous flowers without very striking differences, and by the puzzling seasonal changes through which the individual often passes from spring to autumn. Thus, at the outset nearly all forms of this section tend to be suberect, and, if the conditions of growth are at all favorable, produce upon the main stem lanceolate or more often elliptical leaves, which are relatively large (often 2 to 4 cm. long). With the successive branching, which in *P. aviculare* commonly starts at the very base, the plants in many cases quickly derive a different habit, since the branches are often quite prostrate and always bear leaves of smaller and smaller size. It thus comes about that an old sprawling specimen which has shed all its earlier foliage and retains only the much reduced leaves of the ultimate branchlets possesses so little likeness to the earlier stages of the same plant as to be easily taken for a distinct species. The difference is frequently heightened by changes of color and by the degeneration of the stipules, which are at first whole and white or often silvery, but later turn to brown bristle-formed shreds. To these matters which, however perplexing to the beginner, should not long mislead the careful student, there are added more serious diffi-

culties, which are especially apt to be shown by annuals, namely those which arise from the very unequal nourishment of the different individuals. This especially affects a group of plants which, while quite ready to luxuriate in the best of soil, are equally capable of a hardy advance into the packed earth of foot-paths or sterile sands, where they suffer every degree of inanition. Crowding also affects their manner of growth; thus the typical *P. aviculare* is normally a prostrate plant, but when crowded the individuals are often perfectly erect. Finally, the Polygonums of this section show a fondness for brackish marshes and tidal flats, where they become as one may say maritimized, taking on very gradually the thicker leaves and more fleshy character so common in halophytes. It is easy to see, therefore, why these species are confused in most herbaria.

In interpreting the maritime forms I have been especially assisted by Mr. W. P. Rich, who has devoted much attention to the group and brought together an interesting suite of specimens. I am also indebted to Prof. N. L. Britton and Dr. J. K. Small for the privilege of examining and discussing with them many specimens in the herbarium of the New York Botanical Garden, and to Mr. F. V. Coville and Dr. J. N. Rose for the loan of many sheets from the government collections at Washington. I have been kindly permitted to examine also the Polygonums in the herbaria of Brown University (including the recently acquired herbarium of Prof. W. W. Bailey), the University of Vermont, and Middlebury College, and in the private collections of Dr. E. H. Eames and Messrs. Walter Deane, E. F. Williams, E. L. Rand, and J. F. Collins. Plate 35, illustrating nearly all the forms here discussed, has been drawn with great care by Mr. F. Schuyler Matthews.

The section *Avicularia*, Meisn. Prodr. Gen. Polyg. 43, 85, is characterized by incumbent cotyledons, triquetrous achenes, axillary flowers, and 2-parted or 2-lobed stipules. None of these characters separates the section sharply from other groups in the genus, but in the case of our own northeastern species there never need be doubt in recognizing the section, the axillary flowers alone being a sufficient guide, except in *P. arenarium*, found only once on our coast.

* Achenes at maturity conspicuously exserted beyond the inclosing calyx.

\+ Prostrate, maritime; achenes broadly ovate; flowers relatively large, 2 to 4 mm. in length.

P. MARITIMUM, L. Foliage very pale and glaucous, often nearly white: leaves of the branches small, narrowly oblong, very thick,

usually exceeding the short thick internodes; stipules silvery, conspicuous: sepals 5, broadly obovate, petaloid, contracted at the base, the broad roseate tips inclining to spread in fruit. — Spec. Pl. i. 361 (1753); Meisn. Prodr. Gen. Polyg. 89, & in DC. Prodr. xiv. 88; Eng. Bot. t. 2805; Gray, Man. ed. 6, 439; Small, Monog. Gen. Polyg. 100, t. 37. *P. marinum*, var. *roseum*, Pursh, Fl. 269 (1814). *P. glaucum*, Nutt. Gen. i. 254 (1818). — Sea beaches. MASSACHUSETTS: Woods Hole, 1872, *E. Palmer*; Falmouth, 1 Sept. 1894, *J. R. Churchill*, Sept. 1901, *Miss E. C. Bridge*; Nantucket, Sconset, Aug. 1875, *L. L. Dame*; Marthas Vineyard, 1865, *J. W. Robbins*; Gay Head, *S. Harris*; Edgartown, 11 Sept. 1901, *M. L. Fernald*. RHODE ISLAND; Newport, *J. W. Bailey*; Block Island, *S. T. Olney*. NEW YORK, Hook Point, Long Island, 12 Aug. 1878, *E. S. Miller*. NEW JERSEY, *A. Gray*. NORTH CAROLINA, Carolina Beach, *F. V. Coville*, no. 155. SOUTH CAROLINA, Sullivans Island, *H. W. Ravenel*. FLORIDA, *Chapman*. (Eu.) PLATE 35, FIGS. 17–19.

P. Fowleri, nov. sp. Prostratum glabrum ramosum subcarnosum pallidi-viride; foliis caulinis anguste ellipticis internodia paullo superantibus saepissime obtusis 1.2–3 cm. longis 6–9 mm. latis subtiliter venosis, eis ramorum ramulorumque gradatim minoribus; floribus subsessilibus solitariis vel binis; calice profunde 5-partito, lobis oblongis obtusis subaequalibus albescentibus vel rubescentibus basi non angustatis; achenio olivaceo 4 mm. longo a basi late ovato in rostrum acuminatum attenuato saepissime a calyce arcte amplectente valde exserto. — *P. maritimum*, Fowler, Prelim. List Pl. N. Bruns. 53; Macoun, Cat. Canad. 408 (excl. synon.); Small, Bull. Torr. Club, xix. 362, as to pl. Mt. Desert; not L. *P. Rayi*, Small, Monog. Gen. Polyg. 98, at least as to northern part of range; not Meisn. *P. Raii*, Rand & Redfield, Fl. Mt. Desert Isl. 141, 142; not Babingt. — Sandy shores. NEW BRUNSWICK, 1869, *J. Fowler* (type, in hb. Gray). ANTICOSTI, Salt Lake, 10 Aug. 1883, *J. Macoun*. QUEBEC, Rivière du Loup, 4 Aug. 1896, *E. Brainerd*. MAINE: Mt. Desert Island, Aug. 1891, *K. Furbish*; Southwest Harbor, 24 Sept. 1893, *E. L. Rand*; Great Cranberry Isle, 29 Aug. 1892, *E. L. Rand*; Broad Cove, 13 Sept. 1894, *E. L. Rand*; shore of Little Cranberry Isle, 24 July, 1899, *E. F. Williams*; Cape Newagen, Southport, 7 Aug. 1894, *M. L. Fernald*. PLATE 35, FIGS. 14, 15.

This plant, which I take pleasure in naming for its discoverer, Prof. James Fowler of Kingston, Ontario, bears such a close resemblance to *P. Raii* (or better *P. Roberti*) of the Old World that it is by no means remarkable that it has of late been confused with that species. It differs, however, in several features. The leaves are more obtuse and are not nigrescent in drying, the achenes are smaller and much more sharply beaked and the less petaloid calyx lobes are oblong, not oval.

P. ROBERTI, Loisel. Mém. Soc. Linn. Par. vi. 409 (1827); Hook.

f. & Jacks. Ind. Kew. ii. 598. *P. Raii*, Babington, Trans. Linn. Soc. Lond. xvii. 458 (1836), & Man. Brit. Bot. first six editions. *P. Rayi*, Meisn. in DC. Prodr. xiv. 88 (a mistaken orthography adopted by several American botanists but not employed by Babington notwithstanding reference to 2d ed. of his Man. by Hook. f. & Jacks. l. c.).— This species, which may be distinguished from *P. Fowleri* by the characters given above, may occur upon the coast of our middle states. There is a specimen rather closely simulating it in the herbarium of the New York Botanical Garden, collected at Portsmouth, Virginia, by Rugel, which without a re-examination I cannot pronounce upon more definitely. The name *Roberti* was according to Meisner used to cover mixed material but when previously described elements have been excluded must stand for this species. Plate 35, fig. 16.

+ + Erect; achenes lanceolate.

P. exsertum, Small. Tall, much branched: leaves lanceolate, acutish: flowers borne on slender at length exserted pedicels: calyx small, greenish, inconspicuous, much shorter than the lanceolate attenuate olivaceous much exerted achenes.— Bull. Torr. Bot. Club, xxi. 172 (1894), & Monog. Gen. Polyg. 112, t. 43.— Brackish meadows. Maine, York Harbor, *E. P. Bicknell*, acc. to Small. Rhode Island, Barrington, *S. T. Olney*. Connecticut: Orange, beach at Savin Rock, 11 Sept. 1895, *C. H. Bissell*, no. 1239; East Haven, *A. L. Winton*. New York, New York City, 24 Sept. 1894, *E. P. Bicknell*. New Jersey, Absecom, *W. Boott*. Also in the interior from Illinois to the Saskatchewan. Plate 35, figs. 12, 13.

* * Achenes nearly or quite included.

+ Branches terete or nearly so.

++ Flowers small; sepals (normally 5) greenish white mostly with a roseate tinge, 1.3 to 1.8 mm. long.

= Pedicels included in the sheaths; flowers distinctly axillary.

P. prolificum. Erectum 3–5 dm. altum ramosum vel ramosissimum; foliis lineari-oblongis crassiusculis obtusis vel plus minusve acutis in speciminibus siccatis rugulosi-venosis 1–2 cm. longis 1–4 mm. latis; stipularum laciniis setiformibus flores subsessiles valde superantibus; calyce 5-partito, lobis oblongis apice rotundatis 3 exterioribus viridibus albo-marginatis saepissime rubescentibus, in maturitate reticulati-venosis interioribus duos tenuiores albos paullo superantibus leviter cucullatis 2 mm. longis; staminibus 3; achenio triquetro brunneo acuto 2 mm. longo, faciebus lanceolati-deltoideis leviter concavis lucidis minutissime punctatis.—*P. maritimum*, Young, Cat. Fl. Oak Isl. 14 (1883), not L. *P. ramosissimum*, var. *prolificum*, Small, Bull. Torr. Club, xxi. 271 (1894), & Monog. Gen. Polyg. 114.

— MAINE, York Harbor, 16 Aug. 1893, *E. P. Bicknell.* NEW HAMPSHIRE: Rye Beach, open grassy field, 16 Aug. 1886, *W. Deane*, on salt marsh, 19 Sept. 1901, *W. P. Rich & E. F. Williams*; Hampton Falls, on salt marsh, 22 Sept. 1901, *E. F. Williams.* MASSACHUSETTS: Plum Island, on sand dunes, 4 Aug. 1899, *E. F. Williams*; Oak Island, Aug. 1877, 20 Sept. and 1 Oct. 1882, *H. A. Young*, in sand, 14 Sept. 1900, *W. Deane* (pl. 1 m. in diameter), salt marsh, 16 Sept. 1899, *W. P. Rich*; Cambridgeport, on flats of the Charles River, Oct. 1901, *B. L. Robinson & M. L. Fernald*; Dorchester, Cedar Grove, on salt marsh, 14 Sept. 1888, *W. Deane*; Milton, on salt marsh near Neponset River, 1 Sept. 1883, *W. Deane*; Plymouth Road, 11 Aug. 1878, *E. & C. E. Faxon*; Sea View, Marshfield, on shore of salt creek, 13 Oct. 1895, *E. F. Williams*; Marthas Vineyard, 20 Aug. 1865, *J. W. Robbins*; North Scituate, 6 Sept. 1897, *S. Harris.* RHODE ISLAND; Providence, 30 Aug. 1893, *J. F. Collins*; East Providence, 1879, *W. W. Bailey.* CONNECTICUT: Fairfield, 26 Sept. 1897, and 4 Sept. 1898, *E. H. Eames*; Bridgeport, banks of Cedar Creek (salt), 18 Aug. 1898, *E. H. Eames*; Orange, *C. H. Bissell*, nos. 985, 1214, 1240; Cos Cob, *C. H. Bissell*, no. 5416; Norwalk, *C. H. Bissell*, no. 5171. NEW YORK, Peconic River, L. I., 26 Aug. 1878, *E. S. Miller.* VIRGINIA, Eastville, Northampton Co., Sept. 1878, *W. M. Canby.* Also in Kansas and Nebraska, where quite indistinguishable from the Atlantic form. PLATE 35, FIG. 4.

This is one of several plants which are often confused in herbaria with *P. ramosissimum.* It differs from that species constantly in its smaller subsessile flowers and in the shape of the leaves. As found on our sea coast it does not have the yellow green color of *P. ramosissimum* but is bluish green although often whitened by a parasitic fungus. *P. prolificum* shows close affinity to *P. rurivagum*, Jord. of Europe, but differs from it in the habitually obtusish leaves, included achenes, and more robust habit.

P. AVICULARE, L. Prostrate or, especially when young or crowded, erect: leaves lanceolate, acute, acutish, or obtuse, not at all rigid or fleshy, bluish green; flowers much as in the preceding but surpassing the more hyaline remnants of the stipules; calyx rubescent sometimes deep crimson; achenes dark brown, dull, minutely granular-striate. —Spec. Pl. i. 362 (1753); Meisn. in DC. Prodr. xiv. 97; Small, Monog. Gen. Polyg. 104, t. 39. *P. Bellardi*, Small, l. c. 106, t. 40 (effuse form); Britt. & Brown, Illustr. Fl. i. 562; Britt. Man. 363; not All.— Common weed of dooryards and beaten paths, very tough, persistent, and tenacious of life. PLATE 35, FIG. 5. As noted by Meisner the species is polymorphous; with us occur the following varieties, all freely intergrading.

Var. LITTORALE, Koch. Prostrate; stems stouter, somewhat fleshy and a little lignescent towards the base: leaves oblong, thick-

ish, sometimes acute but with us more often obtuse or rounded at the apex.— Synop. Fl. Germ. 618 (1837). *P. littorale*, Link, Enum. Hort. Berol. i. 385 (1821); Meisn. in DC. Prodr. xiv. 98; Small, Monog. Gen. Polyg. 102, t. 38. The place of publication of the species is traditionally but incorrectly cited as Schrader's Journ. i. 54 (1799), although the name *littorale* appears for the first time as *P. maritimum* * *littorale*, Link in Pers. Syn. i. 439 (1805).— Sea coast. New Brunswick, Carleton, 7 Aug. 1877, *J. Fowler*. New Hampshire, New Castle, on sandy wayside near beach, 19 Sept. 1901, *W. P. Rich*. Massachusetts: Revere, Oak Island, 29 July, 1900, *W. P. Rich*; South Boston, waste land, 20 Aug. 1899, *W. P. Rich*; Scituate, gravel near beach, 8 Sept. 1901, *W. P. Rich*. Rhode Island, Providence, on cove land, 18 Sept. 1899, *J. F. Collins*. Connecticut: *H. S. Clark*, no. 8; Black Rock, 5 Aug. 1898, *E. H. Eames*. Also southward and in the interior, but less well marked. Repeated efforts to substantiate in a suite of specimens the very different characters adduced for the distinction of *P. littorale* by Koch (Linnaea, xxii. 204), Meisner (l. c.), and Small (l. c.), have failed to show them constant as distinctions or even concomitant as variables. Plate 35, fig. 8.

Var. vegetum, Ledeb. Luxuriant, more or less erect, lighter green than the typical form: leaves large, elliptical, 3 to 4 cm. in length, somewhat petioled, the margins crisped.— Fl. Ross. iii. 532 (1849); Meisn. (l. c.) 97.—Rich soil, especially in shade. Newfoundland, Quiddy Viddy, 2 Aug. 1894, *Robinson & von Schrenk*. Maine, Yarmouth on salt flats, 26 July, 1901, *E. B. Chamberlain*. Vermont, Manchester, 4 July, 1898, *M. A. Day*. This variety seems scarcely more than a rich-soil form; it is doubtless widely distributed in America. (Eu.) Plate 35, fig. 6.

The opposite tendency is shown by Var. angustissimum, Meisn. l. c. (*P. neglectum*, Bess. Enum. Fl. Volh. 45, 1821; *P. aviculare*, var. *neglectum*, Aschers. Fl. Brandenb. 51, 1864; and ? *P. aviculare*, var. *laxum*, Ledeb. l. c.) with leaves very narrowly lanceolate or linear. This narrow-leaved form is by no means rare in America but it is poorly marked and shows no constancy in the length of the leaves, degree of diffuseness, etc. Plate 35, fig. 7.

= = Filiform pedicels exserted; flowers equalling or exceeding their subtending bracts and together forming rather definite terminal racemes.

P. arenarium, Waldst. & Kit. Decumbent, branched from the base: leaves lance-linear, thickish and veiny: flowers campanulate: calyx lobes 5, oval, green with thin petaloid red margins.— Pl. Rar. Hung. i. 69, 6. 67 (1802).— Rhode Island, Providence, on cove land, 5 July, 1892, *W. W. Bailey & J. F. Collins*. A waif from the Mediterranean Region to be recognized by its narrow slightly rigid leaves, much reduced bracts, and small but attractive flowers in terminal almost naked racemes.

++ ++ Flowers larger; sepals 2 to 3 mm. long; the pedicels exserted; foliage yellowish green.

= Leaves elliptical, large for this section of the genus.

P. ERECTUM, L. Erect or decumbent, bright yellowish green, 1 to 6 dm. high; stems rather stout, much branched: leaves elliptical to obovate, 2 to 4 cm. long, 5 to 15 mm. broad: flowers yellowish green: achene often slightly exserted.— Spec. Pl. i. 363 (1753); Wats. & Coult. in Gray, Man. ed. 6, 440; Small, Monog. Gen. Polyg. 110, t. 42. *P. aviculare*, var. *erectum*, Am. auth., not Ledeb. *P. ramosissimum*, Meisn. in DC. Prodr. xiv. 97, not Michx. — Dry sunny rich soil, roadsides and especially on rubbish heaps, local. MAINE, Mechanic Falls, in streets, 19 Sept. 1897, *J. A. Allen*. VERMONT, Pownal, 8–11 Sept. 1899, *W. W. Eggleston*. MASSACHUSETTS: South Boston, waste ground, 25 Sept. 1878, *H. A. Young*; Tewksbury, 24 Sept. 1899, *E. F. Williams*; Cambridge, 30 Sept. 1884, *W. Deane*, 28 Aug. 1897, *W. P. Rich*, *E. F. Williams*; Watertown, 12 Sept. 1879, *C. E. Perkins*; Williamstown, 5 Sept. 1897, *J. R. Churchill*. RHODE ISLAND: East Providence, 26 Aug. 1878, *W. W. Bailey*; Providence, Cat Swamp, 2 Sept. 1894 and 15 July, 1898, *J. F. Collins*; Newport, on sandy roadside, 21 Sept. 1901, *W. P. Rich*. CONNECTICUT: Fairfield, 27 Aug. 1892, and 3 Sept. 1901, *E. H. Eames*; Bridgeport, in sandy soil, 7 Sept. 1895, *E. H. Eames*; Southington, waste ground, 1 Sept. 1897, *C. H. Bissell*; Rocky Hill, roadside in rich soil, 3 Sept. 1901, *C. H. Bissell*, no. 5458. PLATE 35, FIG. 9.

= = Leaves lanceolate, narrowed at both ends.

P. RAMOSISSIMUM, Michx. Erect, tall, paniculately branched, 3 to 10 dm. high, yellowish green: stem leaves lanceolate, mostly acute, 3 to 5 cm. long, 5 to 8 mm. broad; the rameal considerably smaller; flowers 3 to 4 mm. long, yellowish green, not at all rubescent, borne on slender mostly exserted pedicels: sepals 6, the 3 outer sharply carinate, somewhat cucullate, green with yellow margins, the 3 inner smaller, thinner, yellow or yellowish white: achene included.— Fl. i. 237 (1803); Wats. & Coult. in Gray, Man. ed. 6, 440, as to char. and western part of range; Small, Monog. Gen. Polyg. 114 in part, t. 44 (where the figure of the calyx shows but five lobes and fails to bring out their characteristic inequality).— MASSACHUSETTS, Truro, sandy bank on border of salt marsh, 30 Aug. 1899, *W. P. Rich*. PENNSYLVANIA, Allegheny County, *Zeigler*. ILLINOIS: Ringwood, *Vasey*; Fountaindale and Ogle County, *Bebb*; Bloomington, *Robinson*. IOWA: Guthrie, *J. A. Allen*; Ames, *Pammel & Combs*, no. 201. WISCONSIN, Prairie du Chien, *T. J. Hale*. MISSOURI, Atchison County, *Bush*, no. 329. OKLAHOMA, Huntsville, *L. A. Blankinship* (distributed as *P. camporum*). KANSAS, Reno County,

Hitchcock, no. 1095 at least in part. Nebraska: Rock County, *Clements*, no. 287b; Cody, Sherry County, *J. M. Bates*, no. 568 (distributed as *P. camporum*); Hooker County, *Rydberg*, no. 1579, and no. 1763 (distributed as *P. camporum*), also no. 1771 (distributed as *P. litorale*). Minnesota: Pipestone, Aug. 1895, *M. Menzel*. North Dakota, Leeds, *J. Lunnell*, nos. 62, 63. Wyoming, Blue Grass Creek, *A. Nelson*, no. 364 (distributed as *P. erectum*). Oregon, *Hall*, no. 448. Washington, Bingen, *Suksdorf*, no. 1406. Plate 35, figs. 1–3.

Many more specimens might be cited but these will be sufficient to illustrate the species. It is noteworthy that of this typical form only one specimen (Mr. Rich's plant from Truro on Cape Cod) has been seen east of western Pennsylvania. Other eastern material referred here has on examination invariably proved to be *P. prolificum* or luxuriant and diffuse *P. aviculare*, or the following readily distinguishable color form.

Forma **atlanticum**, n. f. Calyce nullo modo flavescente, lobis 5 vel 6, exterioribus albo-marginatis plus minusve rubescentibus, interioribus albidis.— Maine: Cumberland, in a hen yard, 31 Aug. 1901, *E. B. Chamberlain*; Old Orchard Beach, 29 Aug. 1898, *M. L. Fernald*, no. 2729. Massachusetts: Edgartown, margin of salt marsh, 11 Sept. 1901, *M. L. Fernald* (type of form); West Falmouth, 16 Sept. 1894, *J. R. Churchill*; North Scituate, on brackish meadow, 6 Sept. 1897, *W. P. Rich & E. F. Williams*; Cambridge, marshes of the Charles River, 4 Aug. 1901, *W. P. Rich*. Rhode Island, Providence, on cove land, 10 July, 1892, *J. F. Collins*. Connecticut: Milford, on brackish marsh, 28 Aug. 1895, *E. H. Eames*; Bridgeport, salt meadow bordering Ash Creek (stems very brittle), 8 Sept. 1901, *E. H. Eames*. This form, although always recognizable by the color of its flowers, shows no constant morphological difference from the western typical form, which as stated above has been found at one station on Cape Cod. It bears also a very striking resemblance to the true *P. Bellardi*, All., of the Old World, which scarcely differs save in its more reduced subulate and slightly rigid floral leaves.

P. Bellardi, All. Closely like the preceding form, but the upper leaves reduced to very acute short and slightly rigid bracts scarcely or not at all surpassing the flowers in their axils.—Fl. Piedm. ii. 205, t. 90, f. 2 (1785).—Of this species, which appears to be frequent and rather widely distributed in Europe and Asia, I have seen only one satisfactory American specimen. That was collected on the South Boston dumping grounds, 3 July, 1879, by *E. & C. E. Faxon*. It was probably a temporarily established waif, as it has not been found during the last twenty years. Plate 35, figs. 10–11.

+ + Branches rather sharply 3–4-angled; leaves lanceolate to linear, pointed at each end, subulate at the apex, of rather firm texture.

P. DOUGLASII, Greene. Leaves revolute at the margins, otherwise nearly flat, obscurely or not at all plicate: flowers soon deflexed.—Bull. Calif. Acad. Sci. i. 125 (1884); Small, Monog. Gen. Polyg. 118, t. 46.—VERMONT, Snake Mountain, in thin soil on sand rock, 14 Sept. 1878, and 22 Aug. 1900, *E. Brainerd*; Castleton, 22 Aug. and 12 Sept. 1897, *A. J. Grout & W. W. Eggleston*. Also westward along the Great Lakes to Rocky Mountains and Pacific Slope. PLATE 35, FIG. 21.

P. TENUE, Michx. Leaves strongly plicate lengthwise, furrowed on each side of the midnerve: flowers erect or nearly so.—Fl. i. 238 (1803); Meisn. in DC. Prodr. xiv. 100; Small, Monog. Gen. Polyg. 122, t. 48.—Dry sandy soil, mostly in open places. MASSACHUSETTS: Melrose, 28 Sept. 1878, *H. A. Young*; Malden, 25 Oct. 1886, *F. S. Collins*; Medford, 14 Oct. 1853, *W. Boott*; Arlington, 15 Aug. 1869, *W. Boott*; Cambridge, 4 Sept. 1891, *M. L. Fernald*; Weston, Summit of Doublet Hill, 14 Oct. 1894, *E. F. Williams*; Milton, on Blue Hill, 14 Aug. 1884, *C. E. Faxon*, 11 Aug. 1895, *E. F. Williams*. RHODE ISLAND, Providence, 10 Aug. 1877, *J. W. Congdon*; near Apponaug, 18 Aug. 1886, *J. F. Collins*. CONNECTICUT: New Haven, *D. C. Eaton*; Stratford, on dry exposed sands, 29 Aug. 1892, and 14 Sept. 1895, *E. H. Eames*; Fairfield, 14 Aug. 1891, *E. H. Eames*; Southington, in dry fields, 28 Sept. 1898, *L. Andrews*, no. 256, and *C. H. Bissell*. Also frequent and locally abundant southward and west to Minnesota. PLATE 35, FIG. 20.

GRAY HERBARIUM, Cambridge, Massachusetts.

EXPLANATION OF PLATE 35.—*Polygonum ramosissimum*; fig. 1, fruiting calyx; fig. 2, a part of the inflorescence; fig. 3, a stem leaf. *P. prolificum*: fig. 4, upper part of a branch. *P. aviculare*: fig. 5, end of a branch. *P. aviculare*, var. *vegetum*: fig. 6, leaf. *P. aviculare*, var. *angustissimum*: fig. 7, leaf. *P. aviculare*, var. *littorale*: fig. 8, a part of the stem and branches. *P. erectum*: fig 9, end of a branch. *P. Bellardi*: fig. 10, inflorescence; fig. 11, a stem leaf. *P. exsertum*: fig. 12, fruiting calyx and mature achene; fig. 13, a stem leaf. *P. Fowleri*: fig. 14, a part of the stem; fig. 15, fruiting calyx and achene. *P. Roberti*: fig. 16, fruiting calyx and achene (drawn from English material). *P. maritimum*: fig. 17, branch; fig. 18, fruiting calyx and achene; fig. 19, a stem leaf. *P. tenue*: fig. 20, a stem leaf (cut transversely to show plicate character). *P. Douglasii*: fig. 21, a stem leaf.

Figs. 1, 12, 15, 16, and 18, are magnified to 5 diameters; the others are natural size.

A FEW PLANTS OF THE BLUE HILLS RESERVATION.

Arthur Clark.

The Metropolitan Park Commissioners have published a Flora prepared under the direction of Mr. Walter Deane, in which most of the species noticed below are mentioned. Personal observations on the occurrence of these plants may, however, be of interest. Several additions to this list will also be made.[1]

Liparis liliifolia is found growing upon a clayey plateau at an elevation of about 400 feet, accompanied by *Anemone virginiana* and *Asclepias quadrifolia*, while a little farther on are large plants of *Geranium robertianum* with innumerable seedlings.

Pogonia verticillata is represented by three large patches, one of which is at the very top of a high hill, near the edge of a water hole.

I have thus far discovered in the Reservation only four species of Habenaria; namely, *H. tridentata* in a maple swamp, *H. lacera* bordering the edge of a pond, *H. psycodes* in three different places, and *H. blephariglottis* in a dry neglected cranberry meadow.

While tracing a brook one day I found *Corallorhiza innata* growing upon hummocks of Sphagnum under low alders, birches, and pines. There were about forty plants some of which were not more than two inches high.

Polygala polygama is quite common and grows along the park roads in the dry sand, exposed to the full rays of the burning sun. Very often the cleistogamous flowers rest upon the top of the ground and are plainly visible. *P. paucifolia* is found in rich springy woods surrounded by ferns and several species of Lycopodium. *Veratrum viride* was also found in these woods, as well as *Clintonia borealis* and *Cornus canadensis*.

Calla palustris, in a muddy swamp and shaded by a sharp hill, reaches a very unusual size.

Half way up Great Blue Hill under red cedars are several shrubs of *Ligustrum vulgare*. This is quite remarkable, so far away from

[1] When this territory was first taken as a reservation a special permit was necessary before one could botanize here. At the present time, however, one is allowed to collect flowers and fruits of specimens, but in order to obtain roots the permit is still necessary. It might be well to state, also, that the Park Commissioners have issued maps of the roads, foot-paths, brooks, etc., of the Reservation, which are of great assistance to those desiring to botanize in this vicinity.

any dwelling. The shrubs were six or eight feet high and nearly perfect in form, and when I last saw them they were completely covered with a mass of white flowers.

Higher up on this hill *Pycnanthemum linifolium* grows in large patches, and near the top *Diervilla trifida* borders the paths upon the north side, while along the road-sides at the foot of the hill a few plants of *Triosteum perfoliatum* may be seen, thickly covered with dust.

Houstonia purpurea, var. *longifolia* is not uncommon, being found in dry sandy soil in much the same surroundings as *Polygala polygama*.

One field well worthy of mention is covered with *Houstonia caerulea* growing in its perfection. When the plants are in flower the field is a mass of Houstonia blue, visible for a long distance.

A narrow but interesting strip of woods covering a portion of a small hill-side furnishes some of the most desirable plants of the whole section. *Conopholis americana*, not found elsewhere in the Reservation, and possibly now reported for the first time this side of Boston, here lifts its fleshy spikes of yellow flowers above the dried oak leaves that cover the ground on the sunny slope of this hill. Seventy-one spikes were counted here last year — a decided increase over those of 1900. *Aralia racemosa* is found sparingly here, and also *Corallorhiza multiflora*, *Goodyera pubescens*, *Actaea alba*, *Desmodium paniculatum*, *D. rotundifolium*, *Chimaphila maculata*, *Cornus canadensis* and *Lobelia spicata*.

This hill abruptly ends in a maple swamp, where a small brook winding in and out and bordered with graceful ferns, makes one of the most picturesque spots in this vicinity. Along this brook at one place, growing in deep Sphagnum, there were in 1899 seven small plants of *Microstylis ophioglossoides*; in 1900 only five were left. After careful search last season three very small specimens were all that could be found there, but upon exploring farther up the brook a collection of about one hundred plants was discovered, some of which measured more than seven inches above the Sphagnum in which they grew. I have found this species in Warquoit, Massachusetts, (a part of Falmouth) growing always under oaks and pitch pines in the grass in sandy soil. It also grows in Holbrook, Mass., in dry oak woods. I have compared the plants found in Sphagnum with those that have grown in sand, and it seems to me that Microstylis fur-

nishes a parallel to *Spiranthes cernua*, one form of which grows in meadows, another very slightly different, on uplands.

Following down the brook we come to a pond just on the line of the Reservation, where numerous species of aquatic plants are well represented. *Lobelia dortmanna* grows here in the shallow water, accompanied by unusually large plants of *Xyris caroliniana*, some of which are more than 4 feet high. On a sunny morning the blossoms of Xyris form a solid mass of yellow, from the sparkling water to the edge of the dark woods. In the grass on the bog *Utricularia cornuta* may be found, together with *Arethusa bulbosa*, and in the fall *Coreopsis trichosperma*. *Utricularia purpurea*, *U. inflata*, *Brasenia peltata*, *Limnanthemum lacunosum*, *Nymphaea odorata*, var. *minor*, and also the type are abundant in the deeper water.

A few plants of *Hottonia inflata* still linger in one of the brooks of the Reservation, while in another *Ranunculus aquatilis*, var. *trichophyllus*, with its long trailing branches, finely dissected leaves, and creamy white flowers, grows luxuriantly in the dark shaded spots.

Aphyllon uniflorum struggles for existence in the crevices of a ledge in one place. *Lupinus perennis* is also found here, although not in such numbers as in a place some distance away by the roadside, not far outside the Reservation.

Anemonella thalictroides and *Viola pubescens* grow together on a rocky, rather barren slope.

Eupatorium aromaticum, one of the most delicate of the Eupatoriums, is scattered over a hillside under stunted oaks, where is also *Ceanothus americanus*, which is rather common along the sandy roads. A few plants of *Smilacina stellata* were found growing upon a moist bank in 1899, but have not been visited since.

The following species which I have collected in the Reservation are not recorded in the Flora above mentioned:

Ranuuculus recurvatus
Geum rivale
Chrysoplenium americanum
Gratiola aurea
Utricularia vulgaris
Polygala paucifolia
Veratrum viride
Clintonia borealis
Hottonia inflata
Conopholis americana
Similacina stellata

Ames Botanical Laboratory, North Easton, Massachusetts.

CERTAIN EATERS OF MUSHROOMS.

Hollis Webster.

With three feet of snow under foot in the woods one hardly has an eye out for mushrooms. Nothing was farther from my thoughts, one bright day last February, as I was laboring up one of the hills in Jackson, New Hampshire. As I caught the end of a convenient fir branch a little a head of me to pull myself a step or two higher up the slope, I noticed something familiar fixed in a fork. Scrambling up to it, I recognized — or thought I did — the remnant of a Tricholoma, a fragment of stem and pileus, nibbled at the edges, and dry as a chip. "Squirrels," I said to myself; for I had often seen red squirrels laying up bits of mushrooms in this way. In the late autumn they are often very busy cutting and carrying off stores of mushroom food to neighboring trees and bushes, where they lodge them under protecting ends of bark, or in convenient forks. Just the object of this bestowal of the food I have been unable to make out. They leave it exposed, and, as my bit of Tricholoma showed, sometimes abandon it altogether. To stay their appetite while working, they often take a mushroom lunch, seated on a convenient stump or tussock, leaving behind them scattered crumbs, and discarded stems. I have watched them making havoc with a fine clump of *Tricholoma portentosum* which I might not have seen had they not scratched away the pine needles under which it was hidden. Has anyone ever seen gray squirrels similarly busy, or engaged in eating fungi?

Though the larvae of insects are no doubt the most confirmed mushroom-eaters, there must be many other animals that feed upon them. It would be interesting to know how many. One would suppose that rabbits might find them toothsome. Mr. Peck suggests that deer feed upon certain kinds — for instance, *Armillaria mellea*, Cattle are said to browse occasionally on *Agaricus campestris* — and perhaps on other kinds — as, for instance, a heavy, fleshy Armillaria, about which there is a tale from Maine. I know that cattle are not afraid to eat even a poisonous species, as the following instance will show.

Two summers ago in Alstead, New Hampshire, as I was passing among the scattered bushes in an upland pasture, I was escorted by

a troop of yearling heifers, that watched me inquisitively. From admiring them my eyes strayed to the ground and fell on some truly superb buttons — they can be superb — of *Amanita muscaria*. I dug one up, cut it, pointed out its characteristics to a companion, and tossed it to the ground again — right under the nose of a black heifer, that had come closer than the others — no doubt hoping for salt. She sniffed at the Amanita, put her tongue to it and then to my surprise ate it as she would an apple. I was a little alarmed, but on second thought, seeing that the mischief was done, it seemed a pity not to make the experiment more conclusive. So I tossed her a second button, which she ate as readily as she had the first. Nothing remained but to wait, or to look for a dead heifer next day. Meanwhile her companions, would serve as a "control." Next day the black heifer was as well as ever, and again sniffing for salt — or for more Amanita. It was perhaps neglectful not to have stayed by her during the hours immediately following her luncheon. Then I should have been able to say whether she suffered any inconvenience. But she certainly was unharmed. If any one wishes to repeat this experiment, I may remark, for his guidance, that mine was made without the knowledge of the owner of the heifer.

Other animals are known to eat fungi. In Gentry's "Intelligence in Plants and Animals" — not a profoundly scientific work — is an excellent photograph (opposite page 200) of a box turtle that has been feeding on what looks like a Boletus. The picture is a counterpart of what I once saw somewhere on Cape Cod. At the edge of some low woods, I came suddenly on a box turtle that had just taken a bite from the pileus of a fresh *Amanitopsis vaginata*. At least I so inferred from the shape of the bite, and from the attitude of the turtle. In the hope that he would take another mouthful, I watched him for some time, but in vain. My patience was exhausted before he stirred, or even altered the pose of his extended head. Numerous observers can, I believe, attest the fact, and one has told me that he has seen these turtles eat poisonous species.

Whether any use of fungi is made by birds I cannot say from personal observation; but I am told by an ornithologist of experience that he has never seen birds eating toadstools. Yet I have seen toadstools with the marks of the bills of birds, but they may have been after insects. I have, however, a record of one instance given me by an observer who vouches for the truth of it. His curiosity

was excited early one autumn morning by the noisy activity of a flock of crows in a field within sight of his bedroom window. He perhaps would have thought no more of the matter had not the same thing occurred on the following day. This stimulated him to investigate. On reaching the spot he found that the crows had been feeding on *Agaricus campestris* which was growing there in abundance. The evidence was unmistakable. Amused at their careless betrayal of their plunder — so unlike the usual behavior of mycophagists — he took measures to anticipate and disappoint the crows thereafter.

CAMBRIDGE, MASSACHUSETTS.

A NOTE UPON RECENT TREATMENT OF HABENARIA HYPERBOREA AND ITS ALLIES.

A. LE ROY ANDREWS.

DR. RYDBERG'S elaboration of this puzzling section of the genus Habenaria in the Bulletin of the Torrey Botanical Club, for November, 1901 (pp. 605–632) recalls notes which I have been accumulating for several years which seem to find their explanation in it. The section has been subject to a variety of treatment, from that of Kraenzlin on the one hand, who reduces its American representatives to two species including as varieties of *Platanthera hyperborea* such distinct forms as Lindley's *Platanthera dilatata*, *P. convallariaefolia* and *P. leucostachys*, to that of Dr. Rydberg, who, maintaining the other extreme, restores the species of Lindley and other authors and adds a number of new ones until the two have become twenty-three. For these he institutes a new genus Limnorchis.

The portion of his key including the six species to which he definitely assigns stations in New England is as follows.—

Flowers green.
  Spur decidedly clavate, thickened and obtuse at apex, shorter than lip.
    1. *L. major* (Lange) Rydb.
  Spur slender, scarcely thickened toward apex, often acutish, equalling or slightly exceeding lip.
Plant tall and stout; flowers comparatively large; sepals 4–6 mm. long.
    2. *L. media* Rydb.
Plant slender, flowers small; sepals 2.5–4 mm. long.
  Flowers almost erect in rather lax spike.
    3. *L. Huronensis* (Nutt.) Rydb.

Flowers lateral in dense spike.

4. *L. hyperborea* (L.) Rydb.

Flowers white or nearly so.

Petals broadly lanceolate; flowers inodorous or nearly so.

5. *L. dilatata* (Pursh) Rydb.

Petals narrowly linear-lanceolate; flowers very fragrant.

6. *L. fragrans* Rydb.

Without discussing the new genus or the general treatment which is clear and illustrated throughout with drawings of the flowers, I should not be greatly surprised if our New England specimens would show forms fitting more or less well into the above classification. My own observations, of which I spoke, are these. In a cold swamp in Pownal, Vt., grows a plant, which could only be assigned to *Habenaria hyperborea*, of enormous size, frequently reaching a height of two feet and upwards, with long, densely-flowered spikes. In woods below a spring, on the lower slopes of Mt. Greylock in Williamstown, Mass., by wooded roadsides in Pownal and at other points in the vicinity is to be found a very distinct form which must also be *H. hyperborea*, the latter slender, rarely a foot in height, with fewer leaves, shorter spikes, and few flowers, so much smaller in every way as to attract one's attention at once. On closer examination a decided difference was evident in the spur, that of the larger specimens being slender, filiform, acute at apex, but slightly curved, and a little longer than the lip, resembling that of *H. dilatata*, while that of the small form was shorter, more curved, seemingly thicker and more blunt. Another point of difference not mentioned in Dr. Rydberg's article, making the two almost impossible of identity, is the date of flowering. The large type as noted for several consecutive years blooms regularly in early June and by first of July has ordinarily completely passed, the smaller not beginning before late July, few flowers being open the past summer on July 21, while in 1898 they were in fresh condition, some yet unopened, on August 6. There is not such difference in condition of habitat as to explain this fact if the plants were the same.

The large form from Pownal corresponds perfectly with the description and illustration of *Limnorchis media*. The name refers to the fact that the form is intermediate between *hyperborea* and *dilatata* types, not at all to size, as Rydberg calls it the largest of the *hyperborea* group. The small type may agree with the original *Limnorchis* or *Habenaria hyperborea*. What I have taken as *Habenaria dilatata*, occurring in a peat-bog in Pownal, is plainly in its narrow petals and sepals and very sweet fragrance his *L. fragrans*. Specimens are cited

of *L. major* from Maine, of *L. media* from Vermont, of *L. Huronensis* from Vermont. Massachusetts, and Connecticut, of *L. hyperborea* f om Vermont; and of *L. fragrans* from Vermont.

Mt. Pleasant, Pennsylvania.

Concerning the Plants mentioned in Young's Chronicles.— In going through the numbers of the Rhodora to record the notices of Essex County plants in my card catalog, I found the article by Mr. S. B. Parish, "Vegetation in Plymouth Three Hundred Years Ago," where the writer quotes "Young's Chronicles of the Pilgrim Fathers 1602–1625," as follows:— .... "vines everywhere, cherry trees, plum trees, ... Many kinds of herbs we found here in winter, as strawberry leaves innumerable, sorrel, yarrow, carval, brooklime, liverwort, water cresses, great store of leak and onions and an excellent kind of flax or hemp" (Rhodora, Jan. 1901, p. 17).

Referring to this often quoted paragraph, the late Dr. Charles Pickering, in a letter to me dated November 10, 1875, writes:—"My attention has recently been directed to Mourt's Relation of the Landing at Plymouth, from his having borrowed Higgeson's account of the plants around Salem, pretending that at Plymouth although 'in winter' there were growing around the landing place

'sorrel, yarrow, carvel, brooklime, liverwort, watercresses,' etc.

'sorrel, brooklime, liverwort, carvell, and watercresses'

were found in 1630 by Higgeson around Salem (Hist. col. I. p. 121.); 'carvell' (chervil) is pretty clearly Osmorrhiza longistylis, observed by myself in Paradise a local name for a formerly lovely region near Salem] in the broken rocky place in front of Gen. Devereux's residence; perhaps the very spot where it was seen by Higgeson. 'brookime,' Veronica beccabunga, has been observed by myself in the cedar-margined outlet of Mineral-spring pond, and may have been seen there by Higgeson, especially as he describes the 'Giant's battle-field' [the scattered boulders: near there].

Higgeson also mentions 'two kinds of flowers very sweet, which they say are good to make cordage' (Apocynum androsaemifolium, and the depressed form of A. cannabinum growing around Middleton pond and pointed out to me by Oakes)."

I think that the quotation from Dr. Pickering's letter requires no comment of mine, but it is evident that the region about Salem not

Plymouth is the one which should be credited with the plants referred to in the old account.— John Robinson, Peabody Academy of Sciences, Salem, Massachusetts.

Hemicarpha in Eastern Massachusetts. — The occurrence of *Hemicarpha subsquarrosa*, Nees, in the town of Framingham, Massachusetts, was reported by the Rev. Ernest C. Smith (Rhodora, i. 98), — the first record of its discovery in Middlesex County. On October 13th, 1901, while examining with Mr. E. F. Williams the peculiar flora about Winter Pond in Winchester, eight miles northwest of Boston, I discovered several minute plants of Hemicarpha growing on a gravelly bank of the Pond at about high water mark. A week later the plant was again found, this time by Mr. Williams, growing on a sandy shore at another part of the same pond. These latter plants were of a much larger size. This discovery of the plant is of interest as adding another station in Middlesex County, — a station which also appears to be the most northern yet recorded in Massachusetts. — E. L. Rand, Boston, Massachusetts.

A Cotton-grass new to North America. — While examining some *Cyperaceae* in the Herbarium of Dr. Dana W. Fellows of Portland, Maine, I was surprised to see a strange *Eriophorum*, superficially resembling *E. virginicum*, but quite lacking the brown scales so characteristic of that plant. An examination of Dr. Fellows's specimen shows it to be *Eriophorum polystachyon*, var. *Vaillantii*, Duby in DC. & Duby, Bot. Gal. pt. 1, 487. From the common *E. polystachyon* with umbels of long-peduncled spikelets, var. *Vaillantii*, which is apparently rare in Europe, is distinguished by the sessile or very short-peduncled spikelets. From *E. virginicum*, which it habitally resembles, it is quickly separated by its lead-colored scales, silvery-white straight bristles, narrowly cuneate-obovoid obtuse achenes, and the very early fruiting season; *E. polystachyon* and its variety fruiting in June, while the rusty-scaled *E. virginicum* fruits in late summer and autumn. Dr. Fellows's material was collected June 16, 1901, on Peaks Island in Portland Harbor, where the dense-headed var. *Vaillantii* is as common as the true *Eriophorum polystachyon*. — M. L. Fernald.

POGONATUM CAPILLARE ON MT. GREYLOCK. — In the February number of RHODORA the article by A. LeRoy Andrews giving a list of the bryophytes of the Mt. Greylock region caught my attention as I once spent a summer in that vicinity and collected on the mountain. I can add *Pogonatum capillare* Brid. to the list. A specimen, determined by Mrs. E. G. Britton and the collector, has been sent to the Herbarium of Harvard University. — ANNIE MORRILL SMITH, Brooklyn, New York.

THE CLIMBING FERN IN NEW HAMPSHIRE. — Some years ago fronds of *Lygodium palmatum* were brought me by friends from Winchester, New Hampshire. In September last I visited Winchester with some others who wished to see the plant growing. As we entered the village we stopped at the first house and inquired if *Lygodium palmatum* was to be found in Winchester; and we were immediately directed to a meadow beside a small stream where on a certain knoll we should find it. There were many knolls all with similar vegetation, but on only one was *Lygodium* found. There it grew luxuriantly over an area ten by fifteen feet, twining over small trees and shrubs and an abundance of *Osmunda regalis*. It was extremely difficult to obtain any of the roots, as they were intertwined with those of the other plants, especially the Osmunda. — MRS. R. E. METCALF, Hinsdale, New Hampshire.

A CUT-LEAVED CHERRY BIRCH. — The tendency in the birches to produce "cut" leaves is often shown in the cultivated form of the White Birch (*Betula pendula*, var. *dalecarlica*), but such leaves are very rarely seen in the native trees of New England. In August last, however, the writer found a small tree of *Betula lenta* exhibiting this tendency. Since such a form was unknown at the Arnold Arboretum and at the Gray Herbarium, a description of the specimen may be of interest to the readers of RHODORA.

The tree in question was about 12 feet tall, and grew at an altitude of 1200 feet, near the town of New Boston, New Hampshire. The outline was very symmetrical, although touching leaves with its neighbors, and the general aspect, including the color, marking and even odor of the bark, was that of the Cherry Birch (*Betula lenta.*) The important variation, however, was shown in the leaves, which

were oblong-ovate, slightly cordate at the base, tapering, *deeply serrate, each segment in turn being sharply toothed.* This fringed appearance of the leaves, and the gracefully horizontal "set" of the branches gave the tree a very ornamental effect. The tree was not in fruit.

Only one tree was found at the time, but further investigation may bring to light other specimens in the same locality, and in this way it will be determined whether the tree is a mere freak — to which the birch is subject — or a well established variety. — Samuel N. F. Sanford, Fall River, Massachusetts.

NOTEWORTHY PLANTS OF CONNECTICUT.

E. B. Harger.

Some twenty years ago my father and myself had *Symphytum asperrimum*, Sims, and *Vincetoxicum nigrum*, Moench, growing in our garden at Oxford. Twelve years ago we left the house and it went into the hands of persons who paid no attention to the preservation of these species. In the summer of 1900, however, I found both growing by the roadside, the former opposite the garden and the latter about two hundred feet distant. As both had increased somewhat last summer, they may probably be regarded as established.

In May, 1901, I found growing in a meadow in Oxford a clump of *Narcissus poeticus*, L., with seven flowering stalks. There is an old cellar in the same field but the house is said to have been in ruins sixty years ago so that the plant has probably maintained itself for that length of time.

A single tree of *Abies balsamea*, Miller, stands in an old pasture in Middlebury. It is nearly a quarter of a mile from the nearest house and until five years ago was as far from the nearest highway. It can hardly be native or planted but is possibly an escape from cultivation.

The preceding are, so far as I know, not previously reported from this state. The following stations for rare species may be of interest: —

Nephrodium simulatum, Davenp. In a deep swamp at Moose Hill, Oxford.

Carex pedunculata, Muhl. Fairly abundant at two stations in Oxford, about two miles apart, growing on steep wooded banks; in one

case beside the Housatonic River and in the other beside one of its tributaries.

Silene Armeria, L. A frequent escape at Seymour.

Lychnis Chalcedonica, L. Southbury.

Draba Caroliniana, Walt. Dry sandy soil near the Housatonic River, 1½ miles above Zoar Bridge, Oxford.

Arabis confinis, Wats. Lisbon. Bank of the Quinebaug River about 1 mile below Jewett City. Here are found also *Juncus Greenei*, Oakes & Tuckerm., *Antennaria Canadensis*, Greene, and what appeared to be *Polygala Nuttallii*, Torr. & Gray, but the material was too scanty for certain determination.

Agrimonia parviflora, Soland. Southbury. This species should be credited to Mr. C. H. Bissell who was first to discover it.

Euphorbia corollata, L. Two plants in grass-land, Oxford.

Hottonia inflata, Ell. Orange. One-fourth mile northeast of the village. Previously discovered by Mr. C. K. Averill.

Stachys palustris, L. Oxford. One mile south of the village.

OXFORD, CONNECTICUT.

In his OUTLINES OF BOTANY[1] Mr. Leavitt has produced a textbook of more than ordinary interest. The work is based upon Dr. Gray's Lessons in Botany, a book which in its several editions has enjoyed great popularity and a continuous usefulness for more than sixty years. This unparalleled success of the Lessons has doubtless been due to its scientific accuracy, remarkable terseness, and unexcelled lucidity, rather than to its pedagogical method. This method was essentially dogmatic throughout. Indeed, the Lessons were prepared at a time when this form of teaching was the approved one, and when it was still possible to state dogmatically many points in morphology, which now in the light of more recent investigation have to be qualified by restriction and exceptions. During the last three decades there has been a great change in the methods of presenting botany in our better high schools. The memorizing of definitions from a book is no longer the aim. There is less study of abstract morphology and less attention to external form. Classifica-

[1] Outlines of Botany for the High School Laboratory and Class-room by R. G. Leavitt, A. M. 8vo, 272, pp. Prepared at the request of the Botanical Department of Harvard University, American Book Co., New York.

tion is no longer the chief end in view. Much more attention is devoted to the vital aspects of plant-life, and the different phases of this broad subject are developed largely by laboratory exercises in which the pupil is led to observe for himself.

The superiority of these more recent methods cannot be questioned. In any such change, however, there is a natural tendency to go too far, and in the enthusiasm of a good movement to pass somewhat beyond the bounds of expediency. The new methods of instructing by practical exercises and laboratory experiments, although far more effective, are much slower than the old one of memorizing. They require much more equipment and better teachers. It thus happens that recent text-books prepared as they have been with the highest ideals and very largely by university professors, have in most instances proved too comprehensive and difficult for practical application in secondary schools. Furthermore, it has been found that the results of the newer teaching in its more extreme form, are not altogether satisfactory, and that the old-fashioned study of plant members is to some extent a requisite for intelligent work in physiology, histology, and ecology.

Mr. Leavitt has combined in his Outlines the best features of the new methods of presentation while retaining what is most important in the old. Moreover, he has presented the whole with remarkable conciseness and clearness. With personal experience in high-school work he has treated his subject in full sympathy with the ambitions and limitations of high school instruction.

Many of the unexcelled illustrations of Isaac Sprague have been wisely retained from the Lessons, but these are supplemented throughout the book by many new and excellent text-figures by Messrs. C. E. Faxon and F. Schuyler Mathews.

Vol. 4, no. 39, including pages 43 to 64, was issued 6 March, 1902.

F. Schuyler Mathews del.

POLYGONUMS OF SECTION AVICULARIA.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 May, 1902 No. 41

OAK ISLAND AND ITS FLORA.

Wm. P. Rich.

Rising out of the salt marsh, but a few hundred feet back from the beach, in the town of Revere, Massachusetts, is a little tract of woodland known as Oak Island. The Eastern Division of the Boston and Maine Railway passes through it, dividing it into two sections, the eastern and the western parts. The Island was, however, originally divided into two parts, between which was a low marshy space, but as the changes in topography that have been wrought in recent years, by the building of a road, race-course, hotel and other accretions to a summer resort, have somewhat obliterated the former lines of division, and as by far the richest flora is found in the grove beyond the railway, it is more convenient botanically to make the railway a dividing line between the two sections.

The eastern part as thus understood contains an area of about eleven acres and the ground is mostly higher and drier than in the western part, and by reason of its frequent use as an excursion resort, the ground covering, excepting around the edges has been pretty much destroyed. The western part comprising about ten acres is a damp open grove and in its rich, black soil grow such a number of interesting plants that for a period of seventy-five years it has been a well-known collecting ground for botanists.

Many similar marsh islands are found along the coasts of Massachusetts and New Hampshire, but in none of them exist such a variety and abundance of notable plants as at Oak Island. Very nearly four hundred species have been recorded growing naturally here. Should there be another tract of land in New England of twenty acres in extent which supports a flora equaling in number of species

that of Oak Island, RHODORA would be pleased to chronicle the fact. Surrounded on three sides by numerous cities and towns, from whose aggressions the intervening marshes have hitherto protected it, and a popular seaside resort close at hand, here the plants which once doubtless spread over a much larger area have been driven and are making a last stand against the encroachments of an ever increasing population and the destructive results to the native flora which necessarily attend it.

From May until October a constant succession of wild flowers fills the damp wood growing in such profusion at times as to produce conspicuous masses of color. One month the ground covering will be tinted with the pale yellow of the *Steironema ciliatum* and the *Gerardia quercifolia*. The next month the scene changes and the flaming yellow of two species of *Helianthus*, *strumosus* and *divaricatus*, will fill the grove with their splendid display, and again as one visits the place a month later, bluish-white masses of *Aster cordifolius* form the prevailing color, and tall plants of silvery *Eupatorium purpureum* and giant stalks of *Lophanthus* rise above the tangled vegetation claiming recognition in this Nature's horticultural show. In smaller volume but hardly less interesting are the very many less self-assertive plants. Humble species, overshadowed by their more conspicuous companions, they fill every inch of intervening space and must be searched for by the careful observer.

In May the yellow violet (*Viola pubescens*), the adder's tongue (*Erythronium Americanum*) and the anemone (*Anemone quinquefolia*) are usually plentiful, although the school-children of the neighboring towns make serious incursions upon them.

In this month also the shadbush whitens the borders of the grove while the *Geranium maculatum*, *Uvularia perfoliata*, *U. sessilifolia*, *Ranunculus abortivus*, *R. Allegheniensis*, *R. recurvatus* and the *Triosteum aurantiacum* are all abundant, extending their flowering time well into June.

The Lousewort (*Pedicularis Canadensis*) as it grows here in compact masses in drier parts of the wood is when in its prime an exceedingly attractive plant.

The white lace-like inflorescences of Cryptotaenia, Osmorrhiza and Actaea are always pleasing and the Actaea is even more showy in fruit with its racemes of cherry-red berries.

Two species of Snake-root grow abundantly, the *Sanicula Mary-*

landica and *S. gregaria*, flowering at about the same time, the former with greenish and the latter with yellowish flowers. Now that Mr. Bicknell has pointed out the differences between these two plants it is a constant wonder that they went unrecognized for so many years.

Around the borders abundance of the purple-flowered *Lythrum Hyssopifolia* grows and the slender-leaved blue iris (*Iris prismatica*); and amidst the salt-marsh grasses is found the *Potentilla Anserina*, its yellow flowers hardly more handsome than the silvery under surface of its leaves. In June *Cornus paniculata* and *Viburnum dentatum*, the most common flowering shrubs to be found, are conspicuous with their dense masses of white flowers, and a month or more later are hardly less so in fruit, the Cornus with clusters of pearly white berries on pink pedicels and the Viburnum in dark blue.

Many salt-marsh species are of course to be found, among which may be noted *Triglochin maritima*, *Plantago decipiens*, *Iva frutescens* and *Teucrium Canadense*.

In July the *Lilium Canadense* is sometimes very abundant, and *Lilium Philadelphicum* is also found. *Circaea lutetiana* and *Desmodium acuminatum* occur in great quantities and the noticeable grass *Asprella Hystrix* lifts its straw-colored racemes high above the surrounding vegetation. During August and September numerous plants of *Scrophularia Marylandica* most conspicuous in fruit attract attention, and tall plants of *Lophanthus scrophulariaefolius* tower above the herbage to a height of six and even eight feet, while its near relative *Monarda mollis*, a most attractive species, is occasionally met with. There is also a numerous colony of *Collinsonia Canadensis*.

With the advent of the Asters, Solidagos and Prenanthes, new elements of botanical interest are introduced.

The seaside golden-rod (*Solidago sempervirens*) forms lines of gold around the borders which are not wholly dulled until December; and *Solidago asperula*, Desf., a species with an interesting history, and *S. arguta* are to be found here.

The handsome *Aster Novae-Angliae* forms dense clumps of purple on the marshy margins, and *Aster salicifolius*, an uncommon species in Eastern Massachusetts, grows in a restricted colony in damp shade and is one of the latest plants to flower, October first being its date of appearance in blossom.

Two species of *Prenanthes*, *trifoliolata* and *alba*, are also conspicuous at this season and easily separated by the difference in the color of the pappus.

It would, however, exceed the limits of this article to call attention to all the wild flowers that bloom in this seaside garden, many of which are not to be found again within a radius of many miles.

In the year 1882 the late Herbert A. Young, then a resident of Revere, made a careful and very complete catalogue of the plants of Oak Island which was published in the Bulletin of the Essex Institute, 1883, and to that publication the writer is indebted for much of the information herewith presented. Mr. Young's list enumerates 336 species of flowering and fern-plants and 28 species of mosses. In the twenty years which have elapsed since that publication some changes must necessarily have taken place in the flora of the Island and it is gratifying to note at this date that but few plants have disappeared from the record, and these missing species are more than offset by the numerous accessions to the flora that have come in during recent years.

Dr. Jacob Bigelow in the Florula Bostoniensis, 1824 and 1840, noted thirteen species from Oak Island or as it was then often called, "Chelsea Beach Island."

In 1882 Mr. Young stated that all of these with the exception of *Phryma Leptostachya*, L. had been collected that season, although he omitted from his own list *Desmodium cuspidatum*, Torr., which had been noted from the Island by Bigelow (as *Hedysarum cuspidatum*). In 1901 all of these thirteen species were still in existence with the same exceptions.

The following is a list of additions to Young's Catalogue that have been collected by the writer and others since the date of that publication (1883). Many of them, as will be observed, are segregations made by botanists since that date and some are plants of a migratory character that appear for a few years and then are gone.

Panicum macrocarpon, Le Conte.

" *boreale*, Nash.

" *unciphyllum*, Trin.

" *lanuginosum*, Ell.

Dactylis glomerata, L. Now very abundant throughout the island.

Agrostis intermedia, Scribner. (*Agrostis perennans*, Tuck., of Young's List).

Bromus secalinus, L. Near stable. July 29, 1900.

Carex mirabilis, Dewey, var. *perlonga*, Fernald.

Betula papyrifera, Marshall. A single tree with yellow-brown bark

in extreme southeastern part. Mr. M. L. Fernald says of this tree that it is a form of the species which is common on Vancouver Island and adjacent coasts.

Sisyrinchium angustifolum, Mill. (*S. Bermudiana* of the List).

Polygonum aviculare, L., var. *littorale*, Koch. Occasional around southern border and in low grass-land.

Polygonum prolificum, Robinson (*P. maritimum* of the list). Very abundant around the borders.

Solanum Dulcamara, L. Several plants in eastern part.

Sanicula gregaria, Bicknell. Very abundant in western part.

Myosotis arvensis Hoffm. Numerous plants in extreme eastern part. June 10, 1899.

Lycopus Virginicus, L. In eastern part. Sept. 11, 1898.

Monarda mollis L. (*Monarda fistulosa* of the list).

Leonurus Cardiaca L. A colony of this species appeared, 1891, in the western part.

Rubus nigrobaccus, Bailey.

" *argutus*, Link.

" sp.? Not yet satisfactorily identified. Abundant on the western border.

Pyrus arbutifolia, L. f., var. *melanocarpa*, Hook. (*P. arbutifolia*, var. *erythrocarpa* of Young's List). A rather puzzling plant with pubescent leaves during early part of the season, but the black globular fruit that of *melanocarpa*.

Agrimonia gryposepala, Wallr. Frequent in the western part.

" *striata*, Michx. Occasional in the western part.

Galium Mollugo, L. First collected by H. A. Purdie 1896, in extreme northeastern part. The specimens are immature and may prove, as suggested by Dr. J. M. Greenman, to be *Galium erectum*, Hudson, another European species.

Nyssa sylvatica, Marsh. A few young plants three or four feet high were seen Aug. 30, 1896. As this species grows abundantly across the marsh on the Saugus side, directly opposite Oak Island, it is probable that berries brought by birds caused its appearance here. Not seen recently.

Potentilla Canadensis, L. Eastern part. May 23, 1900.

Amphicarpa Pitcheri, T. & G. See RHODORA, Vol. 1, p. 27.

Helianthemum majus, B. S. P. Open ground, eastern part. June 28, 1896.

Barbarea vulgaris, R. Br. Western part. Observed May 21, 1895, and May 22, 1899.

Cardamine Pennsylvanica, Muhl. (*C. hirsuta*, var. *sylvatica* of the list).

Brassica campestris, L. Western part. July 14, 1901.

" *juncea*, Coss. Western part. July 14, 1901.

" *Sinapistrum*, Boiss. Western part. July 14, 1901.

Ranunculus Allegheniensis, Britton. Abundant in the western part.

" *repens*. L. Damp ground in the eastern part.

Lysimachia producta, Fernald. Eastern part. See Rhodora, Vol. 1, p. 133.

Cuscuta Gronovii, Willd. Abundant on *Aster Novi-Belgii* in extreme southeastern part. Aug. 13, 1899.

Triosteum aurantiacum, Bicknell, (*T. perfoliatum* of the List).

Vitis aestivalis, Michx. A few young plants in middle of the western part. July 1, 1900.

Ilex verticillata, Gray, var. *tenuifolia*, Watson. See Rhodora, Vol. 2, p. 105.

Atriplex patulum, L. Abundant on southern border in western part.

Antennaria plantaginea, R. Br., var. *petiolata*, Fernald. Eastern part. June 10, 1899.

" *neodioica*, Greene. Eastern part. June 10, 1899.

" *Canadensis*, Greene. Eastern part. May 23, 1900.

Taraxacum erythrospermum, Andrz. Southeastern part. May 23, 1900.

Cnicus lanceolatus, Hoffm. Frequently seen in recent years in the western part.

Lactuca Scariola, L., var. *integrata*, Gren. & Godr. Abundant since 1900 around the southern edges.

Tanacetum vulgare, L. Eastern part. July 29, 1900.

Sonchus asper, Vill. Eastern part, near stable. July 29, 1900.

Prenanthes trifoliolata, Fernald. Abundant in western part.

Solidago Canadensis, L., var. *procera*, Gray. Western part around borders. Sept. 16, 1899.

Solidago asperula, Desf. This is the plant referred to in Young's List as "Solidago sp.? Perhaps a cross between *S. sempervirens* and *S. altissima*." For a full discussion of this interesting golden-rod see Rhodora, Vol. 2, p. 57.

Lapsana communis, L. Appeared about 1894 in eastern part near

the entrance and flourished for several years. Now nearly obliterated.

Of the foregoing 54 species and varieties 40 are additions to Young's List. The remaining 14 representing changes and segregations made since that date.

There have also been some subtractions from the flora of the island, the following plants and perhaps a few others not having been seen by the writer in recent years.

Orchis spectabilis, L. Probably exterminated by visitors digging up the plants for transplanting into gardens.

Cnicus horridulus, Pursh. (*Cirsium horridulum* L.). As this species grows abundantly but a short distance away on the Saugus marshes its reappearance on the Oak Island borders may be confidently predicted.

Gentiana Andrewsii, Griseb. Not found since.

Arabis perfoliata, Lam. Not found since.

Phragmites communis, Trin. Young notes "three specimens in the northwestern part." Here is an instance of extermination from natural causes. It is a well-established fact that the coast of New England has undergone a gradual subsidence at the rate of about eighteen inches in a century. On the Nahant shore opposite Oak Island stumps of forest trees can still be seen just below the low-water line and on the Revere Beach shore the writer is informed by Mr. John H. Sears, the eminent geologist of Essex County, that masses of the roots of Phragmites, cat-tail flag, cow lily, as well as the remains of numerous forest trees, such as beech, white pine, oak, spruce, hemlock and hop-hornbeam have been found imbedded under the waters of the bay. No other locality for the Phragmites is known within a dozen miles, and it is evident that the specimens seen at Oak Island by Mr. Young in 1882 were the last remnants of this giant grass that in former times waved its great plumes in solid phalanx in this vicinity.

Epiphegus Virginiana, Bart. The disappearance of this plant may be attributed to the same cause.

Some species noted in the List as scarce or seen only in a few specimens have greatly increased since that time. Among such are *Leersia Virginica*, Willd., *Verbena hastata*, L., *Pedicularis Canadensis*,

L., *Scrophularia Marylandica*, L., *Lophanthus scrophulariaefolius*, Benth., *Iva frutescens* L., and *Aster salicifolius*.

Their abundance or scarcity, however, depends greatly upon the season as does the vegetation of the whole Island, a dry summer shrinking it to a noticeable degree, while in a moist season it thrives with the greatest luxuriance.

It will thus be seen that the flora of the Island has not diminished in number of species in the interval of twenty years and that the fears expressed by Mr. Young regarding its future have happily to this date been unfulfilled; but the same predictions he made may be safely renewed to-day; the same danger and additional ones hang over it, threatening the "fate of one of the most interesting botanical stations in this part of the country."

The island grove is a great resort for haymakers, hoboes and Hibernians. Haymakers on the marshes stack up great mounds of hay along the borders and take their noon-day rest in its shade. Tramps on their travels between Lynn and Boston make it a rendezvous and several times has the writer in the gloom of a summer evening come upon them as they were preparing a resting place for the night; and Hibernians — well, if one would see the Island in its full glory it should be visited on the occasion of one of their annual excursions.

Fortunately the picnic grounds being in the eastern part, the damage done on these festive occasions has not as yet proved a very serious injury.

SOME CASES OF POISONING BY CYPRIPEDIUM SPECTABILE IN VERMONT.

Alice E. Bacon.

Some months ago Mr. W. W. Eggleston of Rutland narrated an experience indicating that our beautiful pink and white lady's slipper is poisonous, at least to some people. In the summer of 1889 he collected an armful of this plant from a swamp near Rutland and had the flowers near his face a great deal to inhale their fragrance. About a week afterward his forehead and the inner sides of his

wrists began to break out. The second day his entire face was badly swollen and on the fourth the swelling was so extreme that he was unable to see and later his features were so distorted as to be scarcely recognizable. The attack lasted more than two weeks.

About a month after his recovery Mr. Eggleston, not suspecting the cause of the poisoning, went to the same swamp and again collected plants of the lady's slipper. Another attack ensued, similar to the first but less severe. He did not attribute the trouble to the Cypripedium, however, until it was suggested by Professor Jesup of Dartmouth College. The swamp was full of poison ivy, but Mr. Eggleston has always been able to handle that with impunity.

A second case of Cypripedium poisoning has been reported by President Ezra Brainerd of Middlebury College. He states that on one occasion after he had gathered the plant, his sister, who accompanied him and handled the specimens, showed symptoms of serious poisoning, which he attributed to *Rhus venenata*, although the Cypripedium was gathered at a higher altitude than the usual habitat of the poison sumach, and a careful search afterward failed to reveal any of the latter in that locality.

On another occasion a year or two later a large quantity of the lady's slipper was gathered and tied with a handkerchief. The day being warm, the collector used the handkerchief to remove the perspiration from her face. There ensued a most serious case of poisoning affecting the face and eyes as in Mr. Eggleston's case, and lasting about the same length of time.

The narration of Mr. Eggleston's experience recalled to the writer of this note that each year after gathering this lady's slipper, which grows in abundance about Bradford, she had also been severely poisoned, but had attributed the trouble to *Rhus Toxicodendron* or *R. venenata*, both of which have proved exceedingly unpleasant subjects in her case even when they have not been directly handled but have been simply growing among other plants, imparting their poison to them and from them to her.

As the symptoms of the Cypripedium poisoning had not been noted accurately enough for description, one of Mother Eve's direct descendants determined to investigate and gratify her curiosity. The experiment was made in October when the poison was probably not so virulent as when the plant was in full vigor. A stalk was gathered from a clump of *C. spectabile*, which had been under cultiva-

tion and perfectly isolated from any possibility of contact with poison ivy or any other noxious plant. Sufficient exercise was taken to open the pores of the skin. Leaves and stalk were then freely rubbed on the back of the right hand and all around the wrist and fore arm. The effects were as follows:

First day — slight reddening and itching of the parts inoculated.

Second day — swelling in blotches; these quite red; burning sensation in the blotches; no fever perceptible.

Third day — general symptoms of poisoning manifesting themselves, continuing to increase to the sixth day; right hand and arm swollen; blotches dark red; great burning and itching; temperature 100.3° at the highest; pulse 98; headache across the temples; blotches also on the left arm and hand, across the chest, under the arms, and one on the face — all points where the poisoning had appeared in June.

None of these last mentioned blotches were so red or became so troublesome as the spots directly inoculated. Vesication ensued in some of the blotches, followed the ninth day by desquamation. Application of *Hamamelis virginiana* relieved the burning, but as symptoms rather than alleviatives were in question remedies were used sparingly. The tenth day the trouble had disappeared except for a slight redness and the last few white scales.

Further tests will be made next June when the plant is in flower, as it seems probable that that is the time when the poison is most potent. Attempts will also be made to study a remedy.

It is with regret that one of our most beautiful wild flowers must thus be branded with such a vicious reputation; but the conclusion seems irresistible that there is a poisonous property about it which is exceedingly irritating to some skins, although many people are able to handle the plant with perfect safety.

Bradford, Vermont.

Since writing the above I have learned from the Gray Herbarium that the poisonous properties of *Cypripedium spectabile* have been discussed in print by the following writers:

Prof. H. H. Babcock in The Pharmacist, January, 1875. (Both *C. pubescens* and *C. spectabile* regarded as poisonous.)

G[eorge] T[hurber], Bull. Torr. Bot. Club, vi. 11. (A review of the preceding.)

Dr. R. E. Kunze, Rhus versus Cypripedium, Bull. Torr. Bot. Club, vi. 22. (Poisonous qualities of our Cypripediums denied.)

Botanical Gazette, xii, 275. (Editorial mention.)

Prof. H. G. Jesup, Bot. Gaz. xviii. 142. (Instances of poisoning by *C. spectabile* recorded briefly.)

Dr. D. T. MacDougal, Minnesota Botanical Studies, i. 32–36. (Records a conclusive experiment showing poisonous qualities of *C. spectabile*.)

V. K. Chesnut, Principal Poisonous Plants, Bull. 20, U. S. Dept. Agric., Div. Bot. 1898, pp. 19, 20. (Compiled from the preceding and without new data.)

As widely divergent opinions have been expressed in these papers and as the poisonous qualities of *C. spectabile*, although rightly suspected by Professors Babcock and Jesup, and definitely demonstrated by Dr. MacDougal, are not widely known, there seems room for the independently prepared notes presented above.— A. E. B.

THE DISCOVERY OF COMANDRA LIVIDA AND LYCOPODIUM SITCHENSE ON MT. WASHINGTON.

W. W. Eggleston.

Since Mt. Washington has been so thoroughly explored by a multitude of good botanists, it gives one a glow of pleasure to find a new alpine species there. This was particularly so to me, for but a short time before I had been told by one of the old enthusiasts in the botany of the region that there was no chance of new discoveries there.

In company with Mr. H. E. Sargent I made a delightful two days' trip about the mountain June 25 and 26, 1901. We had never visited the station for *Rubus Chamaemorus* at Mt. Clinton on account of its great distance from our usual base, the Glen; but on the morning of June 26th we started on our long 25 mile trip from the Half Way House on the carriage road over to Mt. Clinton and back by the carriage road to the Glen. On reaching Mt. Clinton, it proved very difficult to find flowering specimens of the Rubus so late in the season; and it was during a search for these that I found

what was much more interesting, a fine patch of *Comandra livida*, Rich., in full bloom. It is a rather shy and inconspicuous plant, so it is not strange that no one has found it here before. I have a vivid recollection of a number of careful searches for the species before I could find it at Mr. Pringle's station on Mt. Mansfield. The Mt. Washington station is, I believe, the fifth recorded for *Comandra livida* in New England. The first was at Mt. Mansfield, Vermont, the others on Mts. Katahdin, Abraham and Saddleback in Maine.

During the latter part of August, 1901, I returned to Mt. Washington for a ten days' stay, and while wandering about the Cone on the northwest edge of the "Alpine Garden" I found two small patches of *Lycopodium Sitchense*, Ruprecht. In New England this Alaskan species was first found on Mt. Katahdin by Mr. F. P. Briggs, but it has since been found in northern Maine (see Rhodora, iii. 156, 169, and 278).

The next day I found my first Sibbaldia, a fine ending to my now complete list of Mt. Washington alpine species. I cannot help feeling that there are still some chances for further discoveries on this our highest New England mountain. Some of the plants are of such a very local character that they may be easily overlooked even by those who pass near them. This was the case with Sibbaldia for years before it was rediscovered by Mr. Pringle, and may it not be so with *Dryas octopetala*, L., and perhaps with other species? Careful search in all the more inaccessible localities on the mountain may lead to interesting results. It is to be hoped that New England botanists will not abandon this search altogether for newer fields.

Rutland, Vermont.

SOME NOTEWORTHY PLANTS OF CONNECTICUT.

C. H. Bissell.

Of the species listed below, one is new to New England, and several are new to Connecticut, the remainder being either rare or of unusual interest.

Lycopodium tristachyum, Pursh. (*L. complanatum*, L. var. *Chamaecyparissus*, Milde) Sandy woods, Southington. Also discovered by

Mr. L. Andrews and the writer at Enfield. At the Southington station it is found growing with the common Ground Pine but apparently quite distinct and showing no intergrading forms. The spores are matured much earlier than in the Ground Pine, the fruiting spikes being well developed in the latter part of June.

Avena striata Michx. Limestone ledges with cold northern exposure, Salisbury. This northern species is reported in Bishop's Catalogue to have been collected in Norwich, but Dr. C. B. Graves of New London who has given much study to the grasses of that section informs me he believes that report to be an error.

Carex littoralis, Schwein. Swampy upland woods, East Windsor. Not previously known from New England, the nearest reported station being on Long Island. Its occurrence at this station in the Connecticut valley, fifty miles from the coast, would suggest that it might be a survival from the time when a part of the Connecticut valley was at a lower level and covered by the sea.

Juncus Canadensis, J. Gay, var. *subcaudatus*, Englm. Wet thickets, Southington; bank of Whalebone Creek, Lyme.

Juncus tenius, Willd. var. *Williamsii*, Fernald. Wet ground border of lake, Salisbury.

Salix longifolia, Muhl. Bank of the Connecticut River, Glastonbury. A common species by the river further north but so far as known not before reported from Connecticut.

Phaseolus perennis, Walt. Since the publication of my note on this species in RHODORA 4: 13 January, 1902, Mr. George P. Ells of Norwalk, Connecticut, has written me that the plant was collected there by Miss Mary D. Lockwood in 1898, and that he has since seen it from another station in the vicinity. Mr. Ells noted this collection in the Correspondence Bulletin of the Gray Mem. Bot. Chapter for May, 1901.

This note unfortunately did not come to my notice and the Correspondence Bulletins have never been published.

Callitriche Austini, Englm. Discovered by Mr. L. Andrews and the writer in moist woods in hard soil, along an old highway, Southington. Also collected by the writer in a similar habitat, Branford. An interesting article by Dr. E. H. Eames, about this rare species is found in RHODORA, April, 1901. Dr. Eames supposes the plant to be confined to the immediate vicinity of the coast, but the station at Southington is twenty-five miles inland.

Rhodendron canescens, Don. Low woods, Salisbury. By an unfortunate error Bishop's Catalogue gives *R. canescens* as "common" and omits *R. nudiflorum*, Torr. entirely. The common plant of Connecticut is not *R. canescens*, Don, but *R. nudiflorum*, Torr.; see discussion of the relations of these two species by Mr. Walter Deane, "Notes on the Ericaceae of New England," Rhodora, July, 1901. The specimens from this station at Salisbury are the only ones of typical *R. canescens* that Mr. Deane has been able, thus far, to see from Connecticut.

Mentha Cardiaca, Gerarde. Wet ground, in sandy soil, Southington.

Aster tardiflorus, L. Border of lake in moist ground, Salisbury. The only previous report of this species from the state is founded on a doubtful specimen from East Hartford, now in the Gray Herbarium.

Heliopsis laevis, Pers. Discovered by Mr. L. Andrews and the writer in open woods, in sandy soil, Southington.

Bidens vulgata, Greene. Wet places in rocky ground, Salisbury.

Specimens showing all the species listed above, have been deposited in the Gray Herbarium of Harvard University.

Southington, Connecticut.

NOTES ON LYCOPODIUM CLAVATUM AND ITS VARIETY MONOSTACHYON.

Roland M. Harper.

Dr. Robinson's note on *Lycopodium clavatum*, var. *monostachyon*, in Rhodora (3: 237, 238) last September recalled to me some specimens which I collected in a damp pasture on the northern slope of Little Wachusett Mountain, Princeton, Mass., on Sept. 9, 1898; and when I came across them in my herbarium recently I saw at once that they agreed with his description in every particular. Mr. Leavitt's observations on the same plant in the March number (4: 57) have added still further to my interest in the subject.

The typical form was also collected, at the same time and place as the var. *monostachyon*, but as it was then after sunset I did not

have a chance to observe the relative abundance of the two forms. In my specimens the spikes of the variety were more mature than those of the species, showing that there is some difference between them in the time of fruiting. Or possibly the two-spiked peduncles were a late growth like that mentioned by Dr. Robinson in his note above cited, but as far as I was able to observe they were always on different plants.

Little Wachusett seems to be the southernmost station at which this variety has been collected. The altitude of the point at which my specimens were secured is about 1300 feet.

The original description of *Lycopodium clavatum*, var. *monostachyon* Greville and Hooker (Bot. Misc. 2: 375, 376; 1831) contains the following remarks:

"The whole plant is more compact, the leaves less dentato-ciliate, and less closely imbricated: the spikes solitary in all the specimens, and supported on a peduncle scarcely more than an inch in length."

This does not exactly describe the New England plant, but as the original specimens came from the Rocky Mountains, in latitude 56°, they were probably dwarfed by the arctic-alpine conditions. There is another note on this plant in the next volume of the same magazine (p. 105.)

A specimen in the herbarium of the New York Botanical Garden, collected by R. S. Williams near Lindeman, Yukon Territory, May 4, 1898, corresponds fairly well with the original description. There are no other specimens referable to var. *monostachyon* in this herbarium or that of Columbia University, but in the U. S. National Herbarium I find the following which I would refer here:

Mingan, Southern Labrador, *Wm. Palmer*, Aug. 17, 1887 (two sheets).

Benjamin Hill, Winchendon, Mass., *C. L. Pollard*, Sept. 3, 1895.

Saskatchewan River, *Kennicott* (no date).

Lake Superior (without further data).

The last two specimens are mounted on the same sheet, and both, especially the latter, have rather short peduncles.

Pursh seems to have been acquainted with our plant, but he assigns no definite locality to it. In his description of *L. clavatum* (Fl. Am. Sept. 652. 1814) he says: "It sometimes has only one spike."

While on the subject of *Lycopodium clavatum* it might be of interest to note that while this species is not rare in dry woods in South-

bridge and other towns in the southern part of Worcester County, Massachusetts, where I have observed it every month in the year and in three or four different years, I have found it always sterile in that vicinity. I have seen no record or explanation of this peculiarity anywhere, and it would be interesting to know how far this has been the experience of other collectors. The absence of fructification seems to cause a greater vegetative growth. In the fall of 1897 I collected in Southbridge a specimen which was fully twelve feet long; and this fact was made use of by Lloyd and Underwood in their review of the genus in North America (Bull. Torr. Club, **27**: 159. April, 1900) in giving the dimensions of *L. clavatum*.

One prominent feature of these sterile specimens is that they totally lack the characteristic articulated appearance mentioned by Mr. Leavitt in his recent paper, a fact for which I can suggest no explanation at present.

WASHINGTON, D. C.

UTRICULARIA MINOR IN VINNICUNNET, MASSACHUSETTS. — In an interesting article in RHODORA, vol. 4, p. 42, from the pen of Alice G. Clark I find the inquiry whether anyone else has collected *Utricularia minor* recently, and if so under what conditions.

Utricularia minor, L. was found in July, 1894, by Mr. Oakes Ames near the shore of Lake Vinnicunnet. The following year I collected at the same locality not only this species but also *U. vulgaris*, L., *U. inflata*, Walt., *U. purpurea*, Walt., and *U. cornuta*, Michx., and entered them at the exhibition of wild flowers held by the Massachusetts Horticultural Society early in July at Horticultural Hall in Boston. Almost yearly since then the place has been visited and *U. minor* was growing there still in July, 1901, although not abundantly. It grows in shallow water in a somewhat boggy, muddy soil mixed with sand. Some years the water of the lake has been very high, but this has not seemed to have any hurtful influence upon the plants. Last year I found another station not ar from the first one where a little hillock of decayed pond-weeds, particularly of the Giant Bulrush, *Scirpus lacustris*, L., was carpeted with this small threadlike decumbent *Utricularia*. Among the species of *Utricularia*, *U. minor* is the earliest flowering. I have found it in bloom in

Europe (Sweden) early in June, but cannot say when it begins to flower at the Vinnicunnet stations, which I have not visited before July.

Lake Vinnicunnet is situated near the town of Norton, Massachusetts, $7\frac{1}{2}$ miles from North Easton along the Bay Road and $5\frac{1}{2}$ miles northward from the city of Taunton. The eastern shore is bordered by a broad belt of boggy soil supporting a luxuriant vegetation including most of our commonest bog-plants. Besides the above mentioned species of *Utricularia*, there are also *Eriocaulon septangulare*, Withg., *Hypericum ellipticum*, Hook., *Nymphaea odorata*, var. *minor*, Sims, *Sabbatia chloroides*, Pursh, and others. Higher on the gravelly shore grow *Stachys palustris*, L. and *Hydrocotyle umbellata*, L. Other stations for *Utricularia minor* may well be found here, but owing to the depth of the bog, the obstacles to search are almost insurmountable. — Carl Blomberg, North Easton, Massachusetts.

Gleditschia triacanthos established in Connecticut.— As the question of the naturalization of *Gleditschia triacanthos*, L., the Honey Locust, in New England, appears to be a matter of some controversy, perhaps a few notes taken on its spread in this vicinity may be of interest. A few weeks ago I visited a section where trees of this species appear to be most numerous. From a row of eight or ten individuals planted by the roadside they have spread across the hills for about a mile. I counted 110 in all. To a certain extent they appear in what one might call colonies of from ten to thirty trees; in other places they are scattered, standing singly. A great many of the trees had been cut down but the stumps remained and were measured. They varied from two to twelve inches in diameter; some were even larger, one having reached a diameter of eighteen inches. The species is very persistent, for when the trees are cut down a dozen or more sprouts spring up about the stump. In the region where they grow steep hills of gravel are interspersed with valleys of sandy loam and the trees stand mostly in the valleys.

Now the question naturally arose, how did these trees with their long heavy pods that can at best be blown only a few rods from the parent tree get to such a distance. This question I asked of the owner of the land and he immediately explained that cows ate the pods with relish, in fact appeared rather fond of them. If this state-

ment is correct it easily accounts for the widespread distribution of the species in this vicinity.— LUMAN ANDREWS, Southington, Connecticut.

BIOLOGICAL RELATION OF POLYGONUM HARTWRIGHTII TO P. AMPHIBIUM. — *Polygonum Hartwrightii*, Gray, and *P. amphibium*, L., ordinarily seem quite distinct. *P. amphibium* is generally found in water and has thick shining leaves on long petioles, mostly clustered at the end of the long floating stems. *P. Hartwrightii* is usually found on muddy borders of ponds or along ditches in wet meadows, has longer and narrower leaves that are nearly sessile and more or less hairy, the stems are erect, very leafy, and the sheaths have a peculiar foliaceous spreading border. It is to be noted however that Dr. Gray in describing *P. Hartwrightii*, states that it is very closely related to *P. amphibium*, the flowers and fruit being the same, the only difference being in the habit and foliage. *P. Hartwrightii* is notoriously sterile, it being a rare thing to find it in fruit in this region.

Attention was called to these plants in consequence of the finding of what appeared to be *P. Hartwrightii* where before only *P. amphibium* had been seen. The writer had supposed the two forms to be distinct and every endeavor was made to prove that to be the case, but without avail. *Polygonum amphibium* is common in Shuttle Meadow Lake, in Southington. This lake furnishes the water supply for the city of New Britain, and most of these observations were made at this station, though the same facts were noted at another place.

During the long dry summer of 1900, the water in the lake was drawn down to much below its ordinary level, and its sloping banks gave an unusual opportunity to study the plants under varying conditions. The facts as found after several visits and much tracing out of stems and root systems were as follows:

As the water receded the floating stems of *P. amphibium* were left stranded on the banks. They would retain life for a time, often taking root at the tip and sometimes at the joints, but generally would at last die and wither away from exposure to the dry air. Then from the same root or from the lower joints of the old stems would spring new erect stems having the foliage of *P. Hartwrightii*. Different forms of leaf would occur showing all variations of intergrading forms.

In some cases it was possible to secure specimens that still retained some of the old formerly floating leaves at the tip of the long stems, yet had erect stems from the same root, bearing the hairy leaves and foliaceous sheaths of *P. Hartwrightii.*

In early October when the water was at its lowest point, the plants farthest up the bank had lost nearly all trace of the *amphibium* form, while lower down all stages of transformation could be seen between that and the plants still floating in the water, true *amphibium.*

The fact that in this case the same root that produced typical *P. amphibium* when under water, produced typical *P. Hartwrightii* when left exposed for a time above water, would seem to prove that *P. Hartwrightii* is not a distinct species but a terrestrial form of *P. amphibium.* It is nothing unusual that this should be the case, as many other species are known to take different forms under such conditions. *Ranunculus multifidus* and its var. *terrestris*, and *Myriophyllum ambiguum* and its var. *limosum*, are illustrations of such variations.

From the scarcity of flowers and fruit in the terrestrial plants of this Polygonum, it would be inferred that the species was in its normal habitat when growing in water. Although *P. Hartwrightii* in the locality where I have observed the transitions above described, is obviously only a biological state of *P. amphibium*, this state appears to become in other places the habitual form, so that it requires some taxonomic recognition. It cannot be regarded as a distinct species, and it may be best to call it *P. amphibium*, var. **Hartwrightii** as it appears closely analogous to the varieties of Ranunculus and Myriophyllum, mentioned above. — C. H. Bissell, Southington, Connecticut.

Saleratus as a Protection against Rhus-poisoning.— In the matter of Ivy-poisoning, discussed by Franz Pfaff, M. D., in the March Rhodora, I have had a little experience which may be of interest to those readers who have been kept from exploring rich floral fields through fear of *Rhus venenata*, the poison Dogwood. Not far from my home, on the boundary between Southbridge and Charlton, Massachusetts, there is a large sphagnous tract, known as Cedar Swamp. A good-sized pond lies concealed in it, and where the road crosses the swamp one can from the roadside run a pole down many feet without reaching bottom; yet the tangle of roots is so thick that by exercising a little care it is possible to walk upon

the surface and reach all parts of the swamp. The vegetation is very rich and includes among many other plants the following attractive and interesting species: *Saracenia purpurea* L., *Kalmia glauca* Ait., *Vaccinium Oxycoccus* L., *Azalea viscosa* L., *Cypripedium acaule* Ait., (I have been told that the white Lady's Slipper grows there, but have not found it yet), *Calla palustris* L., *Trillium erythrocarpum* Michx., *Larix Americana* Michx., *Chamaecyparis sphaeroidea* Spach, *Menyanthes trifoliata* Town., *Peltandra Virginica* Raf., *Clintonia borealis* Raf., and occasionally *Habenaria fimbriata* R. Br. Indeed, I find some plant new to me every time I go through Cedar Swamp.

Being very susceptible to Ivy and Dogwood poison I was long deterred from exploring this rich collecting ground, but I can now ramble over it with perfect impunity. I take with me a bottle filled with a strong solution of saleratus (the common kind used in cooking). When I come out of the swamp I wash my hands, face, and neck — wherever it is possible that the poison has touched the skin — with the solution. Since doing so I have never been poisoned and can roam through the place at will. I take no needless risks and am always careful not to touch the Dogwood if I see it. However, it is so thick that it would be impossible to avoid it altogether.— L. E. Ammidown, Southbridge, Massachusetts.

Rare Plants about New Bedford.— In addition to some rare plants previously mentioned in Rhodora by the writer, the following unusual in this vicinity may be worthy of notice. *Cuphea viscosissima*, Jacq. was found last fall in Dartmouth (but a few miles from New Bedford) in a field near the seashore. A considerable number of specimens were obtained. The range of this plant is given as Rhode Island, and west and south. The above extends it into south eastern Massachusetts. It would be interesting to know if it has been found elsewhere in the State. *Scabiosa australis*, Wulf. was found here three or four seasons ago, and on revisiting the location last summer I obtained several more specimens; the capitate head of flowers on a long peduncle, resembles somewhat *Mentha aquatica*.

A fine patch of *Symphoricarpos vulgaris*, Michx. was found about seven miles from the city by the roadside; it did not appear to be an escape from cultivation as it was half a mile from a dwelling on one side, and more than a mile from one on the other side.

Matricaria discoidea, DC. I have recently found in several places in the city, growing on sidewalks made by filling in sand or gravel. *Lysimachia vulgaris*, L. not to be found here formerly, has suddenly appeared and been seen in widely different localities. The bright and attractive little *Sabbatia stellaris*, Salisb. was found in a marsh by the sea for the first time last summer; the larger species *S. chloroides* has always been common here.— E. WILLIAMS HERVEY, New Bedford, Massachusetts.

[*Scabiosa australis* occurs in abundance at Raynham, Massachusetts.—Ed.]

VERONICA CHAMAEDRYS IN NEW ENGLAND. — *Veronica Chamaedrys*, L., an attractive European species of speedwell has long been recognized as a rather local introduction in our Middle States. Its range in the sixth edition of Gray's Manual does not include New England and while the range given by Professor Britton in his recently published Manual is extended eastward to Nova Scotia, the species is still so local and so little known in New England that it seems worth while to record the following stations which have been recently brought to the attention of the staff of the Gray Herbarium.

In June, 1895, Mr. Walter Deane showed me a small patch of this Veronica in the shade of trees at the edge of a large inclosed tract of grass land between Cambridge and Watertown, Massachusetts. There was no evidence that its presence there was the result of cultivation, either present or past, and it was scattered in a firm turf of grasses and clover quite in the manner in which several of the other and more frequent species of Veronica occur.

A little later Mr. Edward B. Chamberlain sent to Mr. Fernald specimens of *V. Chamaedrys* collected in damp soil at New Castle, Maine. This station was recorded in the Second Supplement to the Portland Catalogue of Maine plants.

In the summer of 1901 Mr. W. H. Blanchard found this species closely covering several rods of an old mowing on the slope of Glebe Mountain, at Windham, Vermont, which is its first recorded station in that state.

Last summer the plant was also reported by Mrs. H. A. Penniman as occurring at South Braintree, Massachusetts. Concerning it she writes as follows: "The plant was found by a small boy in South Braintree, May 30, 1901, in deep grass a little removed from

an old vegetable garden. This garden is elevated above a factory pond and separated from it by Viburnums, Clethra, elders, and other growths usually found in such places. Visiting the spot later with the boy I found about fifteen individuals of the Veronica, although I have no doubt there were many more in the neighborhood."

I am informed also that *V. Chamaedrys* has been found by Dr. C. B. Graves at New London, Connecticut, where it is established on a lawn. This station was recorded by Mr. J. N. Bishop in his recent catalogue of Connecticut plants.

It will thus be seen that this species has now made its appearance in four of our New England states.— B. L. ROBINSON.

THE STATURE ATTAINED BY EUPHRASIA OAKESII.— I have several times collected *Euphrasia Oakesii*, Wettst. at its well known station near Mt. Monroe, where as stated by Prof. Robinson in his recent revision of the North American species of Euphrasia (RHODORA, iii. 272) it grows only from 2 to 5 cm. high. I was, therefore, surprised while collecting *Rhinanthus Crista-galli*, L.; about the brooks in Oakes Gulf to find in a moist gravelly pocket mammoth specimens of this usually dwarf Euphrasia, some of which were no less than 12 cm. high.— W. W. EGGLESTON, Rutland, Vermont.

THE CYCLOPEDIA OF AMERICAN HORTICULTURE.— With the fourth volume of the Cyclopedia of American Horticulture issued on February 26, 1902, Professor L. H. Bailey has brought to a close his great work. These volumes contain descriptions of all the species of plants known to occur in the trade in North America, north of Mexico and, while embracing, in the main, ornamental plants, allow a liberal interpretation of the word "horticulture," treating also of plants of agricultural and economic value. Professor Bailey has enlisted in his work a very large number of eminent specialists and it is gratifying to see so many names of our leading New England horticulturists, florists and landscape gardeners among the number. Often several persons have contributed to a single genus, its history, treatment in cultivation and the systematic arrangement of its species with critically prepared keys being all made the subjects

of most careful consideration. By the aid of these keys the reader can readily trace the plant he is studying to its proper species. The value of this aid to the student cannot be overestimated.

The Cyclopedia is copiously illustrated by original pictures, in the main line drawings. These represent a great variety of subjects, but are chiefly those of plants which are drawn from living specimens wherever possible, thus carrying out the idea of making "a live record of the real status of our horticulture." These pictures are arranged so that one at least and generally several will be seen wherever a volume is opened. Common and trade names of plants are introduced and referred to their proper places where they are treated; the horticultural status of the various states in the Union is given, and there are many articles of great worth on subjects which have a bearing on the general plan, such as, seedage, railroad gardening, graftage, insects, etc. In addition there are sketches of those who have aided in advancing the progress of horticulture by their attainments and well-directed efforts. In the matter of nomenclature the system of Bentham and Hooker is with a few exceptions followed in generic names, as this makes fewer changes in the accepted horticultural terms, and, as trade names have their own value in the market, this is of the greatest importance.

A critical examination of the work reveals its great value; it is an inexhaustible fund of information. The keys are accurate and the characters that have been drawn in the case of the various genera and species are terse and to the point, and are relieved by valuable bits of information still further elucidating the plants in question. The illustrations are artistically as well as accurately drawn and leave nothing to be desired in that direction. The practical information as to the cultivation of the species is based upon Professor Bailey's wide experience and that of his skilled assistants who have contributed to these volumes.

A work of this character, so wide in its scope and general treatment and carried out with such infinite skill and patience marks an epoch in the history of the literature of American Horticulture. The only other work of the kind ever published in this country is Henderson's "Handbook of Plants" which appeared first in 1881 and in a single volume. It is earnestly to be desired that a yearly supplement partially promised by the Editor, will be forthcoming. The first will contain a key to the families and genera employed in the work.

Too much praise cannot be given to Professor Bailey and his able associate editor, Mr. Wilhelm Miller, for the painstaking and conscientious labor that has marked the progress of the Cyclopedia and can be seen as we peruse its pages. The editor may well say as he closes the last volume: "It was a sad parting. The pleasantest associations of a pleasant life had come to a finish."—WALTER DEANE.

The Committee of Arrangements of the JOSSELYN BOTANICAL SOCIETY OF MAINE announce that the Annual Meeting and Field Day of the Society for 1902, will be called at Machias, July 8 to 11, inclusive.

Announcement of the programme and transportation and hotel arrangements will be sent to members two weeks previous to the meeting.

All who wish further notices or to become members of the Society should address DORA H. MOULTON, Sec'ry, No. 9 Hill Street, Portland, Me.

Vol. 4, no. 40, including pages 65 to 86 and plate 35, was issued 4 April, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 June, 1902 No. 42

THE MARINE CLADOPHORAS OF NEW ENGLAND.

F. S. Collins.

(Plate 36.)

There is probably no other genus of algae which has a distribution so universal, both in fresh and salt water, as Cladophora. Its range includes extreme northern and southern latitudes and all regions between, including every possible station where the plant can be submerged all or part of the time. Species of Cladophora sometimes constitute dense attached masses of great extent in lakes and rivers, or floating strata in quiet waters; the fresh water species are not so numerous as the marine, however, and the latter are found in almost every station where algae can grow at all. Exposed rocky shores, quiet bays, still lagoons, marsh creeks, all are apt to abound with these plants. If we except loose sandy beaches, where no algae of any kind can grow, there is probably not a stretch of a few rods in all New England, reached by salt or brackish water, where Cladophoras cannot be found, at least in spring or summer.

There is seldom any difficulty in determining whether a plant belongs to this genus; the generic characters are clear enough, but there is perhaps no genus of New England algae that is so distinct from all other genera as the genus Cladophora, and at the same time contains so many species of vague characters and uncertain limits. Both in the matter of determining a particular specimen collected and in the matter of ascertaining some definite principles, by which the almost innumerable forms may be arranged in natural and easily recognized groups, it offers great difficulties.

Founded in 1843 by Kützing[1] it includes those species of the

[1] Linnaea, Vol. XVII, p. 91, 1843.

older genus Conferva which have fronds composed of repeatedly branching, monosiphonous, articulated filaments. The fruit in all is substantially the same; the contents of practically any cell in the frond may be transformed into numerous zoospores, which escape through an opening in the side wall. The shape of the cell is only slightly if at all changed in this process. Kjellman[1] has attempted to use characters derived from these fruiting cells for the distinction of species among the Scandinavian Cladophoras, but it is doubtful if the characters he uses will be found available generally. There remain for distinction only vegetative characters; — the size of the frond as a whole, the diameter and length of cells in the main filaments and their branches; the arrangement of the latter, alternate, opposite, whorled or secund; the angle at which they issue; their straightness or curvature, acuteness or bluntness; the shade of color; and finally, the presence or absence of special rhizoidal or spinous branches in addition to the normal ramification. All these characters vary much according to external conditions, and also with the age of the individual plant, so that a knowledge of a species as it appears in different environments, and an acquaintance with all stages of growth are necessary before an attempt can be made at drawing specific lines. Add to this the fact that most of the species seem to be still in an evolutionary state, and connected by innumerable intermediate forms, and it will be seen that the identification of a specimen with some one of the 300 described species, often very loosely and insufficiently characterized, is no easy matter.

On the other hand, there is the advantage that none of these characters requires careful microscopic study. In most cases a pocket lens will give all the characters needed, and in some cases even the pocket lens is unnecessary; while a magnification of 40 or 50 diameters will furnish all that can be needed in any case. The trouble is not in perceiving the characters, it is in keeping in mind the type for each species, and deciding what relative weight to give to apparently contradictory characters; to decide what is really characteristic of the species, what due to external conditions.

The number of species occurring on the New England coast is quite limited, but even as to these few the lines of demarcation are

[1] Studier öfver Chlorophycéslägtet Acrosiphonia J. G. Ag. och dess Skandinaviska Arter. Bihang till K. Svenska Vet.-Akad. Handlingar, Band. 18, Afd. III, No. 5, Stockholm, 1893.

indistinct, and their identity with European types is unsettled. Harvey[1] credits to the New England coast 11 species of the 19 which he describes for North America. Farlow[2] gives 14 species and 3 varieties. A familiarity for quite a number of years with the plants as they grow along our shore, has led the writer to conclude that some changes should be made in these lists, and the present paper is intended to give a revised list, with the principal characters; 17 species, 6 varieties and 3 forms being included.

In determining a specimen, a good plate is better than any description, and an authentic specimen in good condition is better than any plate. References have therefore been made in the following pages, under each species, to such books and sets of exsiccatae as are likely to be found at the principal botanical and educational centers, and will be of most assistance to the student. The references to Harvey, LeJolis and Hauck have in almost all cases been verified by authentic specimens in the Farlow Herbarium at Cambridge and in the writer's collection. In the case of the older authors, such as Roth and Dillwyn, authentic specimens have not been obtainable, but wherever there seems to be reason for doubting an identification, the doubt has been indicated. Plate 36, accompanying this paper, is intended to supplement the descriptions, chiefly as to the lesser branches of the various species. The figures should be considered as schematic, rather than as accurate drawings to scale.

Of the three subgenera, Aegagropila, Spongomorpha and Eucladophora, the first is not represented by any marine species in this region. Spongomorpha, with plants densely matted in the lower part or throughout by special hooked branches or by descending rhizoidal filaments, and Eucladophora, which lacks these special branches, are both common. A not absolutely accurate, but perhaps useful key to our species, may be found in the following:

Artificial Key to the New England species of Cladophora.

Filaments matted together by descending rhizoidal filaments or hooked branches in the older parts. SPONGOMORPHA. a

Filaments free or more or less intertwisted, but not matted together by special branches. EUCLADOPHORA. d

[1] Nereis Boreali-Americana, part 3, Smithsonian Contributions to Knowledge, Washington, 1858.

[2] Marine Algae of New England and adjacent coast, Report of the U. S. Fish Commission for 1879, Washington, 1881.

a. Filaments 20–40 μ diameter. *C. lanosa.*
a. " 50 μ diameter or more. b
b. Older parts of the frond abundantly furnished with curved, hooked or circinate branches with very acute tips; cells in older part of frond ½–1 diam. long. *C. spinescens.*
b. Hooked branches few or none; filaments usually increasing in diameter upwards; terminal cells blunt; more or less matted below by rhizoidal filaments. c
c. Filaments about 60 μ below, 100 μ above; cells usually 2–4 diameters long. *C. arcta.*
c. Filaments about 100 μ below, 150–250 μ above; cells, except near the tips, ½–1½ diameters long. *C. Hystrix.*
d. Filaments slender, usually 40–60 μ diameter, pale green, densely interwoven into a spongy mass. *C. albida.*
d. Filaments free or somewhat interwoven, not spongy. e
e. Fronds attached only in the early stages, soon detached and forming dense floating masses in shallow warm water. f
e. Fronds remaining attached throughout the whole active life. g
f. Main filaments 100–150 μ, branches much smaller, divaricate; ultimate ramuli secund. *C. expansa.*
f. Main filaments seldom over 100 μ diameter, branches of successive orders gradually smaller, ultimate ramuli not conspicuously secund. *C. fracta.*
g. Filaments and main branches usually under 100 μ diameter. h
g. " " " " " over 100 μ " l
h. Fronds soft and silky, utterly collapsing when taken from the water. i
h. " firmer. j
i. Cells 6–20 diameters long; plant of sheltered bays. *C. Rudolphiana.*
i. " 2–6 " " ; usually in upper rock tide pools. *C. glaucescens.*
j. Filaments short, rigid, more or less creeping; branches few. *C. Magdalenae.*
j. Fronds freely branched. k
k. Branches recurved, pectinated with similar recurved branchlets. *C. refracta.*
k. Branches regularly flexuous throughout the frond. *C. flexuosa.*
l. Filaments rigid; plants of exposed rocky shores. m
l. Filaments not rigid. n
m. Filaments dark green, branches erect or appressed, opposite or whorled. *C. rupestris.*
m. Filaments lighter in color, ultimate ramuli blunt, short, densely packed at the ends of the branches; branching chiefly alternate. *C. laetevirens.*
n. Filaments 100–250 μ diameter; ultimate ramuli stout, blunt, constricted at nodes. *C. Hutchinsiae.*
n. Filaments 40–150 μ diameter; ultimate ramuli slender, not constricted at nodes. o
o. Filaments with comparatively few main branches, beset throughout with short, patent, often secund ramuli. *C. hirta.*
o. Filaments much branched, branches of successive orders decreasing in size, the tips set with series of secund, patent ramuli. *C. gracilis.*

In considering the species in detail, it appears that the subgenus Spongomorpha should rank higher than Eucladophora, the species of the former having the branches differentiated, part being normal and erect, part rhizoidal and descending; in some species there is a

third type, hooked, curved or circinate, while the normal filaments are straight and erect. In the species of Eucladophora the branches vary in length and diameter, but not otherwise. In Kjellman's paper before mentioned he uses the generic name Acrosiphonia with practically the same extension as Spongomorpha, giving as his reason that the characters given by J. G. Agardh [1] are essential characters of the genus, while those given by Kützing,[2] are non-essential and uncertain. As, however, the earlier name Spongomorpha has been generally received, either as a genus or a subgenus, while Acrosiphonia appears to have been dropped by the author and forgotten, the earlier name can hardly be displaced, under any system of nomenclature. Whether its rank should be generic or subgeneric is more of an open question: in the present paper it is treated as a subgenus. Apart from the question of the rank of Spongomorpha and Aegagropila, there is no question as to the extent and limitations of the genus Cladophora.

Cladophora.

Frond consisting of articulate, branched, monosiphonous filaments, with terminal or intercalary growth. Cells cylindrical or subcylindrical, plurinuclear, with disk-shaped, parietal chromatophores.

Sub-genus Spongomorpha.

Fronds with normal erect filaments, increasing in diameter upwards, with long terminal cell from which cells are successively cut off below; these cells continuing to divide, so that the cells in the older parts of the filaments are much shorter than those in the growing tips; also with descending rhizoidal filaments, and in some species patent, acute, hooked or curved branches, the older fronds being more or less densely matted together by the descending or patent branches.

C. arcta (Dillw.) Kütz.

Kützing, Phyc. Germ., p. 207.
Harvey, Phycologia Britannica, Pl. CXXXV; Nereis Boreali-Americana, part 3, p. 75.

[1] J. G. Agardh, Anadema, Novum Genus Algarum, p. 12, Stockholm, 1848.
[2] Kützing, Phycologia Generalis, p. 273, 1843.

Le Jolis, Algues Marines de Cherbourg, p. 64.
Hauck, Deutschlands Meeresalgen, p. 445.
De Toni, Sylloge Algarum, Vol. I, p. 335.
Farlow, New England Marine Algae, p. 50.
Hauck and Richter, Phycotheca Universalis, Nos. 13, 426.
Collins, Holden and Setchell, Phycotheca Boreali-Americana, Nos. 224, 815.

Conferva arcta, Dillwyn, British Confervae, p. 67, Plate E.

Fronds rich green, in dense tufts, fastigiate, about 60–100 μ diameter, cells 4–6 diameters in the growing tips, $1\frac{1}{2}$–3 diameters in other parts of the frond; erect, stiff, much branched, branches erect or appressed, obtuse or clavate, giving off descending rhizoid-like branches, 40–60 μ diameter, cells several diameters long, by which the lower part of the tuft is firmly matted together.

A spring plant, appearing as early as February in favorable localities; at first a bright rich green, becoming darker and duller in the older plant. Found along the whole New England coast, it is more common and luxuriant in the northern half, less from climatic conditions than from the prevalence of exposed rocky shores, which are its special habitat. At Newport, R. I., where favorable conditions occur, it is abundant and luxuriant.

In most of the references quoted above, the species is taken in a wide sense, and would probably include *C. Sonderi* and *C. spinescens*, here considered distinct. The exsiccatae quoted, however, are *C. arcta* as here understood.

C. Hystrix (Strömfelt) De Toni.

De Toni, Syll. Alg., Vol. I, p. 339.
Spongomorpha Hystrix Strömfelt, Om Algvegetation vid Islands Kuster, p. 54.
? *C. Sonderi* Kützing, Phyc. Germ., p. 208.
Hauck, Deutsch. Meeresalg., p. 44.
? *Spongomorpha Sonderi* Kützing, Tab. Phyc., Vol. IV, p. 17, Pl. LXXIX.

Fronds rich green, in rather dense tufts, filaments straight, branches very erect, except in the lower part of the older fronds, where they are more open; about 100 μ diameter at the base, increasing in size upwards, the end cell of the young, vigorously growing filaments sometimes reaching a diameter of 250 μ; cells generally one half to one and one half diameters long, the terminal cell sometimes four diameters. Rhizoidal descending filaments fairly common in the older parts, 40–60 μ diameter, cells 3–10 diameters long.

Resembling a luxuriant *C. arcta*, but the filaments are larger, the cells shorter, the tufts less matted. It has been found at Newfoundland, Isaac Holden; Nahant, Mass., Peak's Island, Maine.

The description given above is based on the Nahant and Newfoundland specimens, and does not agree exactly either with Ström-

felt's description of *Sponogomorpha Hystrix* or with Kützing's of *Cladophora Sonderi.* Strömfelt's plant, however, appears to differ from ours merely in being more luxuriant, the filaments reaching a diameter of 225 μ in the lower part, 360 μ in the upper part, with cell lengths in proportion; the only other character mentioned is that the filaments are often variegated by empty cells alternated with the normal ones. This is hardly a definite character, but is likely to occur from external causes. The variegated character is not noticeable in a specimen of Rosenvinge, from Godthaab, Greenland, No. 162, which in all other respects agrees perfectly with Strömfelt's description.

As regards *C. Sonderi*, the case is not quite so clear; the original description in the Phycologia Germanica reads "Aeste gleichhoch, an der Spitze $\frac{1}{30}$–$\frac{1}{26}$‴, unten bis $\frac{1}{15}$‴ dick; Glieder meist so lang als das Durchmesser, unten bisweilen doppelt länger, oben oft halb so lang." This would indicate that the filaments were twice as large in the basal part as at the tip, but the figure of *Spongomorpha Sonderi* in the Tabulae Phycologicae shows no such distinction, the upper part being a trifle larger, but only a trifle. If the original description is correct, the species does not belong in Spongomorpha at all: if the plate is correct, it would seem that Kützing's name should be retained. I have not been able to examine an authentic specimen, but I have received from Reinbold a specimen from Helgoland, the original locality, which he has marked *C. Sonderi;* it has short joints and filaments largest at the tip, but the size of the filaments is less than in the American plant, thus approaching *C. arcta.*

The largest dimensions are found in specimens from the extreme north, Greenland and Iceland; it may be best to consider it as an arctic species, diminishing in size as it ranges south, and at Helgoland, its extreme southern limit as to conditions though not in latitude, only slightly exceeding *C. arcta.* The latter species has a wider range, plants growing in Greenland and Iceland being practically identical in character and size with plants from the English Channel or from Long Island Sound. That the typical *C. arcta* is found at Iceland in company with but distinct from *C. Hystrix*, speaks strongly for their being distinct species.

C. SPINESCENS Kütz.

Kützing, Species Algarum, p. 418.
C. arcta var. *centralis* Collins, Holden & Setchell, Phyc. Bor.-Am., No. 721.
Spongomorpha spinescens Kützing, Tab. Phyc., Vol. IV, p. 16, Pl. LXXVIII.

Main filaments about 80 μ, cells $\frac{1}{2}$–1 diam., growing tips up to 100 μ diam., cells 2 diam. long. Branches either erect and somewhat clavate, or patent and acute; branches of the latter type either short and spine-like or long, hooked, revolute or even circinate. The

descending rhizoidal filaments are not uncommon, but the matting together of the fronds is due more to the peculiar hooked branches.

From *C. arcta*, under which it is included by most authors, it differs by the acute hooked branches, shorter joints, and the less fastigiate character of the frond. This last character, though apparently constant in American specimens, is not uniform in European forms, some of them being reported as quite level topped. In *C. arcta*, except in older stages, the flat or rounded top of the frond is very noticeable, while the American *C. spinescens*, even in the younger stages, has more the form of rope-like, many times branched fronds; somewhat like *Ectocarpus tomentosus*. *C. arcta* is a plant of early spring, and grows on rocks; *C. spinescens* is nearly always epiphytic, and is in excellent condition in July, when only battered forms of *C. arcta* are to be found.

It has been collected by the writer at Nahant, Mass., at St. George's Bay, at Pemaquid, and at Mt. Desert, Maine.

C. LANOSA (Roth) Kütz.

Kützing, Phyc. Gen., p. 269.
Harvey, Phyc. Brit., Pl. VI; Nereis Bor.-Am., part 3, p. 76.
Le Jolis, Alg. Mar. Cherb., p. 63.
Farlow, N. E. Marine Algae, p. 51.
Hauck, Deutsch, Meeresalg., p. 447.
De Toni, Syll. Alg., Vol. I, p. 336.
Hauck & Richter, Phyc. Univ., No. 276.
Collins, Holden & Setchell., Phyc. Bor.-Am., No. 661.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 204.
Conferva lanosa Roth, Cat. Bot., Vol. III, p. 291.

Filaments 30–40 μ diam., light green, cells 2–6 diam. Fronds fastigiate, branches erect, blunt, more or less matted at the base by descending rhizoidal filaments, slightly smaller than the main filaments. Epiphytic on various algae.

This species is quite distinct, and has been maintained unchanged since its establishment in 1806. It is found along the whole New England coast. It appears in April, is in good condition in May and June; in the latter part of June and in July the fronds become detached, and float ashore in the form of soft, round, pale green tassels, two or three centimeters in diameter.

C. LANOSA var. UNCIALIS (Fl. Dan.) Thuret.

Thuret in Le Jolis, Alg. Mar. Cherb., p. 63.
Farlow, N. E. Marine Algae, p. 51.
Hauck, Deutsch. Meeresalg., p. 447.
De Toni, Syll. Alg., Vol. I, p. 336.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 77.
C. uncialis Harvey, Phyc. Brit., Pl. CCVII; Nereis Bor.-Am., part 3, p. 77.
Conferva uncialis Fl. Dan., Pl. DCCLXXI, fig. I.

Tufts irregular in outline, not fastigiate except in early stages. Growing on rocks.

In size and character of filaments hardly distinguishable from the type, but forming, when well developed, irregular tufts, reminding one of *C. spinescens*. It is saxicolous, and the fronds do not float away bodily at maturity, like *C. lanosa* type, but persist in a battered and unattractive state through the summer. It is found along the whole New England coast.

Sub-genus Eucladophora.

All branches similar, not increasing in size upwards, terminal cell short, adult cells not subdividing.

C. albida (Huds.) Kütz.

Kützing, Phyc. Gen., p. 267.

Harvey, Phyc. Brit., Pl. CCLXXV; Nereis Bor.-Am., part 3, p. 80.

Le Jolis, Alg. Mar. Cherb., p. 59.

Farlow, N. E. Marine Algae, p. 51.

Hauck, Deutsch. Meeresalg., p. 458.

De Toni, Syll. Alg., Vol. I, p. 525.

Conferva albida Hudson, Flora Anglica Ed. 2, p. 595.

Fronds soft, dense, pale green, filaments 20–30 μ [1] diam., cells 4–5 diam., delicate; branching irregular, ultimate ramuli long, patent, blunt.

Rather common in southern New England, usually easily distinguished by the spongy character of the frond and the slender filaments.

C. albida var. refracta (Wyatt) Thuret.

Thuret in Le Jolis, Alg. Mar. Cherb., p. 60.

Collins, Holden & Setchell, Phyc. Bor.-Am., No. 720.

Cladophora refracta Harvey, Phyc. Brit., Pl. XXIV; Nereis Bor.-Am., part 3, p. 79.

De Toni, Syll. Alg., Vol. I, p. 324.

Conferva refracta Wyatt, Algae Danmonienses, No. 228.

Like the type in character of frond and size of filaments, but with recurved branches in the upper part of the frond, set with recurved ramuli. *C. refracta* has similar branches and ramuli, but is a much coarser plant. Some forms of *C. flexuosa* are puzzling, but the main branches in the latter are larger than anything in *C. albida*, and neither *C. refracta* nor *C. flexuosa* has the spongy substance of *C. albida*. It occurs probably all along the New England coast, but

[1] When the diameter of the filament is given in this form, for species of the subgenus Eucladophora, the larger dimensions are for the main filaments, the smaller for the ramuli; in the subgenus Spongomorpha the normal branches increase in size upward, and the larger dimensions refer to the tips.

is more common in the south. There has been much confusion as to the plant to be called *C. refracta*; there seems to be no way of ascertaining what was Roth's *Conferva refracta*, but Wyatt's plant is without much doubt a variety of *C. albida*.

C. RUDOLPHIANA (Ag.) Kütz.

Kützing, Phyc. Gen., p. 268.
Harvey, Phyc. Brit., Pl. LXXXVI; Nereis Bor.-Am., part 3, p. 80.
Farlow, N. E. Marine Algae, p. 54.
Hauck, Deutsch. Meeresalg., p. 457.
De Toni, Syll. Alg., Vol. I, p. 321.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 267.
Conferva Rudolphiana Agardh, Flora, 1827, p. 636.

Fronds long and loose, yellowish green, gelatinous, branches often opposite, patent, flexuous, ultimate ramuli secund, tapering; cells 20–60 μ diam., much longer than broad, sometimes up to 20 diameters.

A plant of warm, shallow bays chiefly, growing on stones or algae, below low water mark, often in large quantities; the individual fronds sometimes a meter in length, always soft and gelatinous. It is common from Nantucket to New York, but only occasionally found north of Cape Cod; the northernmost point being Kennebunkport, Maine. Herbarium specimens of *C. Rudolphiana*, *C. albida* and some forms of *C. gracilis* are not always readily to be distinguished, microscopic characters only being available; but the living plants can usually be recognized. *C. albida* is very soft and spongy; *C. Rudolphiana* soft but not spongy; *C. gracilis*, even in its slenderest forms, has a certain harshness to the touch, as compared with the two other species.

C. GLAUCESCENS (Griff.) Harv.

Harvey, Phyc. Brit., Pl. CXCVI: Nereis Bor.-Am., part 3, p. 77.
Le Jolis, Alg. Mar. Cherb., p. 60.
Farlow, N. E. Marine Algae, p. 52.
Hauck, Deutsch. Meeresalg., p. 460.
De Toni, Syll. Alg., Vol. I, p. 320.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 205.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 817.
Conferva glaucescens, Griffiths in Wyatt, Alg. Danm., No. 195.

Fronds 10–40 cm. long, loosely tufted, glaucous or yellowish green, much branched, ultimate ramuli long, erect, acute, sometimes secund, filaments delicate, 30–60 μ diam.

A plant of spring and early summer, found all along our coast and extending south to Florida and north to Labrador. It grows both in quiet bays and in tide pools on rocky shores, especially upper pools where the water becomes quite warm from the sunshine between one high tide and another. In these pools the natural bright glaucous

green is changed in the upper part of the frond to yellowish green or almost white.

The *C. glaucescens* of the Phycologia Britannica is figured and described as having articulations uniformly near three diameters. The plant of northern New England has cells usually 4–6, sometimes even 12 diameters, agreeing with Hauck's description. This difference in the length of the articulations is of little importance, other characters being identical.

C. FLEXUOSA (Griff.) Harv.

Harvey, Phyc. Brit., Pl. CCCVIII; Nereis Bor.-Am., part 3, p. 78.
Le Jolis, Alg. Mar. Cherb., p. 60.
Farlow, N. E. Marine Algae, p. 54.
Hauck, Deutsch. Meeresalg., p. 456.
De Toni, Syll. Alg., Vol. I, p. 311.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 206.
C. gracilis Collins, Holden & Setchell, Phyc. Bor.-Am., No. 724. Not typical.
Conferva flexuosa Griffiths in Wyatt. Alg. Danm., No. 227; not of Dillwyn nor Jürgens.

Light green, fronds 10–20 cm. high, main filaments 80–120 μ diam., branches 40–80 μ, quite regularly flexuous, bearing alternate or secund, curved and sometimes refracted ramuli; articulations in branches 2–3 times as long as broad, in main stems up to 6 diam. Growing chiefly in rock pools, usually nearer low water mark than *C. glaucescens*, from which it is also distinguished by a firmer texture, less luxuriant branching, curved ramuli, and uniformly flexuous filaments. It is not so easy to distinguish well developed plants of *C. flexuosa* from small forms of *C. gracilis*, *C. hirta* or *C. laetevirens*, but normal forms can be fairly well made out, by the difference in the size of the filaments. It occurs all through our range, and as far north as the Gut of Canso, Macoun, and is in its best estate in July.

C. FLEXUOSA forma **densa** Collins ms.

Branching of all orders very dense, texture of frond spongy.

In habit much like *C. albida*, but in dimensions of cells and form of branches like typical *C. flexuosa*. Found growing in dense masses at low water mark, Easton's Point, Newport, R. I.

C. GRACILIS (Griff.) Kütz.

Kützing, Phyc. Germ., p. 215.
Harvey, Phyc. Brit., Pl. XVIII; Nereis Bor.-Am., part 3, p. 81.
Farlow, N. E. Marine Algae, p. 55.
Hauck, Deutsch. Meeresalg., p. 457.
De Toni, Syll. Alg., Vol. I, p. 322.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 209.
Conferva gracilis Griffiths in Wyatt, Alg. Danm., No. 97.

Fronds up to 30 cm. long, yellowish or glaucous green, main filaments up to 160 μ diameter, irregularly bent, branching at the angles,

the branches more slender, beset at the tips with long, secund, attenuate, acute branchlets, 40–60 μ diam., cells 3–5 diam.

It is very difficult to give a description of this species that will enable a stranger to recognize it, and yet, in its typical form, it is fairly distinct. It is very variable, passing into *C. flexuosa*, *C. hirta* and *C. laetevirens*. In its typical form it has not the uniformly flexuous filaments of the first, the abundant short ramuli of the second, nor the stout fastigiate ramuli of the third; but forms partaking in greater or less degree of all these characters are only too common. North of Cape Cod the prevailing form is elongated, with very erect branches; this form is occasionally found south of Cape Cod, but the more common form has more patent branching, giving quite a different aspect, though there are no technical distinctions. Farlow's description in the N. E. Marine Algae fits best with the southern form, as does also No. 209, Alg. Am.-Bor. Exsicc., quoted above; this southern form is nearer *C. flexuosa* than the northern form. No. 206 of the same is quite typical *C. flexuosa*; No. 724 of Phyc. Bor.-Am. is between the two, but should be ranged under *C. flexuosa* rather than, as distributed, under *C. gracilis*.

It is a summer and autumn plant, preferring sheltered places, sometimes occurring in large quantity in muddy bays and harbors, and it is found all along our coast. One form and two varieties can be distinguished by name.

C. GRACILIS forma **elongata** Collins.

Collins, Holden & Setchell, Phyc. Bor.-Am., No. 725.

Fronds attached, with few and erect branches, stretching out on the surface of the water for a meter or more; color very glaucous green.

An extreme development of the ordinary northern form, apparently conditioned by its location, shallow warm water pools, on islands in Penobscot Bay, Maine.

C. GRACILIS var. EXPANSA Farlow.

Farlow, N. E. Marine Algae, p. 55.

Frond soon detached, forming loose floating masses, irregularly branched.

With the habit of *C. expansa*, but not forming a dense felt, floating loosely in the water of tide pools etc.; Gloucester, Nahant, Mass., W. G. Farlow; Cape Rosier, Maine, F. S. Collins.

C. GRACILIS var. **vadorum** (Aresch.)

C. gracilis var. *tenuis* Thuret in Le Jolis, Alg. Mar. Cherb., p. 61.

Farlow, N. E. Marine Algae, p. 55.

Conferva vadorum Areschoug, Alg. Exsicc., No. 19.

Filaments slender, 40–100 μ, branches few, articulations 4–8 diam.

Forming indefinite masses below low water mark, Gloucester, Mass., Farlow; Atlantic City, N. J., S. R. Morse.

Areschoug's name having been published in 1840, it would seem

that it should be retained as a varietal name, in preference to Thuret's var. *tenuis*, published in 1863.

C. HIRTA Kütz.

Kützing, Phyc. Germ., p. 208.
Le Jolis, Alg. Mar. Cherb., p. 60.
Hauck, Deutsch. Meeresalg., p. 456.
De Toni, Syll. Alg., Vol. I, p. 329.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 726.

Filaments rather stiff, 50–200 μ diam., more or less bent, more or less branched, beset throughout or nearly so with short, usually secund, subacute ramuli; articulations 2–4 diam., rarely 6.

Somewhat resembling *C. gracilis* and probably having passed under that name; but it is coarser than most forms of the latter, and has not the long slender ramuli at the tips of the branches. The extent of ramification varies much, some forms having filaments a decimeter long with no branches other than the short ramuli which occur, several on one side and several on the other, or sometimes nearly all on one side, over the whole or the greater part of the frond. Sometimes the tip of a branch is quite bare, while all the lower part has the secund ramuli.

It occurs throughout our range, mostly in rather exposed places, but seems to be not so common as some other species; this, however, may be due to its having only recently been distinguished from *C. gracilis* in this country.

C. EXPANSA (Mert.) Kütz.

Kützing, Tab. Phyc., Vol. III, p. 27, Pl. XCIX.
Le Jolis, Alg. Mar. Cherb., p. 61.
Farlow, N. E. Marine Algae, p. 55.
Hauck, Deutsch. Meeresalg., p. 462.
De Toni, Syll. Alg., Vol. I, p. 319.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 210.
Collins, Holden & Setchell., Phyc. Bor.-Am., No. 121.
Conferva expansa Mertens in Jürgens, Decade 8.

Fronds dull green, loosely branched, the main branches 100–150 μ diam., flexuous, with smaller, patent, secondary branches, divaricately divided; ultimate ramuli 40 μ diam. secund, blunt, articulations 3–6 diam.; at first attached but soon loosened and floating.

Common in shallow pools and especially in lagoons where the water is warm and the level varies little; here it forms a thick felty coating on the surface of the water, usually in company with *Lyngbya aestuarii* and species of Enteromorpha. It is found throughout our whole range.

C. EXPANSA var. GLOMERATA Thuret.

Thuret in Le Jolis, Alg. Mar. Cherb., p. 61 (without description).

Ultimate ramuli in closely set tufts; quite different in habit from the type, but evidently not specifically distinct.

Bridgeport, Conn., Isaac Holden.

C. FRACTA forma MARINA Hauck.

Hauck, Deutsch. Meeresalg., p. 461, excluding synonymy.
Hauck & Richter, Phyc. Univ., No. 68.
C. fracta Harvey, Phyc. Brit., Pl. CCXCIV; Nereis Bor.-Am., part 3, p. 83, as to marine forms.
Le Jolis, Alg. Mar. Cherb., p. 59.
Farlow, N. E. Marine Algae, p. 56; not of list of algae of Southern N. E.

Tufts irregular, dull green; filaments somewhat stiff, 80–120 μ diam., sparingly and somewhat dichotomously divided; branches spreading, angularly bent, with few and irregular quite blunt ramuli; articulations usually 3–6 diam.

C. fracta is an abundant and very variable species in fresh water, the world over, but occurs only occasionally in salt water, and may perhaps be considered less a true marine plant than as a stray form, out of its normal element. Still it does occur in submarine and even distinctly marine stations on many coasts, and must have a place in any marine list. Its nearest ally is *C. expansa*, a more freely and regularly branched plant; characteristic forms can readily be distinguished, but there are many forms, especially old and worn individuals, where the line is hard to draw. Indeed, old and battered specimens of any species of Cladophora make fairly good *C. fracta*.

C. FRACTA forma **flavescens** (Harv.).

C. flavescens Harvey, Phyc. Brit., Pl. CCXCVIII.

Filaments more slender than in the type, usually 30–60 μ diam.; articulations 6–10 diameters, ultimate ramuli tapering but with blunt tips; forming dense floating masses in high, warm pools.

Marblehead, Mass.; Rockaway, Long Island, N. Y.

C. MAGDALENAE Harv.

Harvey, Phyc. Brit., Pl. CCCLV, A.
Le Jolis, Alg. Mar. Cherb., p. 59.
Farlow, N. E. Marine Algae, p. 56.
De Toni, Syll. Alg., Vol. I, p. 325.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 572.

Fronds short, coarse, dull green, matted, procumbent, with patent, flexuous branches, which have a few irregularly arranged, curving ramuli; filaments 60–100 μ diam., articulations 2–4 diam.

In some respects seeming like a form of *C. fracta*, but apparently as distinct as can be ordinarily expected of a Cladophora. It grows among other algae between tide marks, creeping in entangled masses. It has been found only in two localities; Napatree Point, R. I., D. C. Eaton; Milford, Conn., Isaac Holden.

C. REFRACTA (Roth) Areschoug.

Areschoug, Alg. Exsicc. Scand., No. 338; not Phyc. Brit., Pl. XXIV nor De Toni, Syll. Alg., Vol. I, p. 324.

Farlow, N. E. Marine Algae, p. 52.
Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 207.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 573.
C. hamosa var. *refracta* Hauck, Deutsch. Meeresalg., p. 457.
Hauck & Richter, Phyc. Univ., No. 272.
? *Conferva refracta* Roth, Cat. Bot., Vol. II, p. 193.

Filaments rather stiff, 40–120 μ diam., articulations 2–3 diam., glaucous green; branches flexuous, the secondary branches and those of subsequent orders at first erect, then reflexed; ultimate ramuli often secund, blunt.

A common form in rocky pools throughout our whole range, and not very variable. It has a characteristic habit, not easy to describe, but recognized without much difficulty, even in mounted specimens, when once known; but forms of *C. flexuosa* sometimes resemble it pretty closely.

There is uncertainty as to what *Conferva refracta* Roth really was, but the *Cladophora refracta* of Areschoug seems to be a fairly distinct species, while the *C. refracta* of French algologists is apparently a variety of *C. albida*.

C. RUPESTRIS (L.) Kütz.
Kützing, Phyc. Gen., p. 270.
Harvey, Phyc. Brit., Pl. CLXXX; Nereis Bor.-Am., part 3, p. 74.
Le Jolis, Alg. Mar. Cherb., p. 63.
Farlow, N. E. Marine Algae, p. 51.
Hauck, Deutsch. Meeresalg., p. 452.
De Toni, Syll. Alg., Vol. I, p. 328.
Collins, Holden & Setchell, Phyc. Bor.-Am., No. 728.
Conferva rupestris Linnaeus, Syst. Nat., Edit. 12, Vol. II, p. 721.

Filaments dark green, 80–150 μ diam., articulations 3–4 diam.; fronds densely tufted, much branched, the branches opposite or in fours, erect, ultimate ramuli short, blunt or slightly subulate.

In the confusion that exists in this unhappy genus, it is pleasant to find one species about which there can be no mistake, and *C. rupestris* is nearly unmistakable, with its dense, dark, stiff tufts with opposite or whorled branches. It is a rather handsome plant while growing, but herbarium specimens seem coarse, and do not adhere well to paper. It grows on rocks near low water mark, often covered by Fuci, and seems to be in good condition all through the year, while most Cladophoras are spring and summer plants. It is common from Nahant north, and is also found at Gay Head, Farlow.

The plant is figured and described by Harvey as having subulate ramuli, but in most American specimens examined the ramuli are blunt; in a few cases only are they slightly acuminate.

C. LAETEVIRENS (Dillw.) Harv.
Harvey, Phyc. Brit., Pl. CXC; Nereis Bor.-Am., part 3, p. 66.

Farlow, N. E. Marine Algae, p. 53.
C. laetevirens var. *glomerata* Le Jolis, Alg. Mar. Cherb. p. 82.
C. utriculosa var. *laetevirens* Hauck, Deutsch. Meeresalg., p. 455.
Conferva laetevirens Dillwyn, British Confervae, Pl. XLVIII, p. 66.

Filaments 50–150 μ diam., rigid, yellow green, much branched; branches erect, often opposite; ultimate ramuli short, obtuse or subacute, densely fastigiate at the tips of the branches; fronds up to 20 cm. long, articulations of main branches 6, of ramuli 3 diameters.

A stout and rather coarse species, perhaps best distinguished by the dense tufts at the ends of the branches, with blunt ramuli not much smaller than the branches. It is found from Nahant north, in exposed lower pools or below low water mark, but does not seem to be very common. Battered forms of *C. gracilis* or *C. hirta* are not easily distinguished from it, though when in good condition there is little danger of their being confused.

C. Hutchinsiae (Dillw.) Kütz.
Kützing, Phyc. Germ., p. 210.
Harvey, Phyc. Brit., Pl. CXXIV.
Farlow, N. E. Marine Algae, p. 53.
Hauck, Deutsch. Meeresalg., p. 453.
De Toni, Syll. Alg., Vol. p. 314.
Conferva Hutchinsiae Dillwyn, Brit. Confervae, p. 65, Pl. CIX.

Frond rather glaucous green, up to 40 cm. high; filaments 120–300 μ diameter, stiff, flexuous, sparingly branched; ultimate ramuli few, secund, blunt, constricted at the nodes, articulations 2–3 diam.

This species has considerably larger filaments than any other of the subgenus Eucladophora on our coast, and is not likely to be mistaken. There does not appear to be any authentic specimen of the type from New England, the one quoted by Farlow, N. E. Marine Algae, proving to be wrongly marked, and to belong to California. But it has been collected at Atlantic City, N. J., agreeing very well with the specimens distributed in the McCalla's Algae Hibernicae, No. 28, and Wyatt's Algae Danmonienses, No. 226, the main filaments equalling 300 μ diam., though not so densely branched as some of the French specimens.

From its occurrence on the New Jersey coast, there is reason to expect it in New England.

C. Hutchinsiae var. distans (Ag.) Kütz.
Kützing, Sp. Alg., p. 392.
Hauck, Deutsch. Meeresalg., p. 453.
De Toni, Syll. Alg, Vol. I, p. 315.
C. diffusa Harv., Phyc. Brit., Pl. CXXX; Nereis Bor.-Am., part 3, p. 83.
Conferva distans Agardh, Syst. Alg., p. 120, 1824.
Conferva diffusa Dillwyn, British Confervae, Pl. XXI; not of Roth.

Main branches long, nearly bare of secondary branches; joints longer than in the type, nodes not constricted.

Habit quite different from the type, but otherwise similar. Found at Gloucester, Mass., and at Long Point, N. J., at which latter locality it is connected with the type by intermediate forms.

MALDEN, MASSACHUSETTS.

EXPLANATION OF PLATE 36. — *Cladophora arcta*: fig. 1, part of filament with descending rhizoids. *C. Hystrix*: fig. 2, tip of filament. *C. spinescens*: fig. 3, filament with recurved branch. *C. albida*: fig. 4. *C. Rudolphiana*: fig. 5. *C glaucescens*: fig. 6. *C. flexuosa*: fig. 7. *C. gracilis*: fig. 8. *C. hirta*: fig. 9. *C. refracta*: fig. 10. *C. expansa*: fig. 11. *C. fracta*: fig. 12. *C. rupestris*: fig. 13. *C. Hutchinsiae*: fig. 14. *C. laetevirens*: fig. 15.

THE BLOOMING OF HEPATICAS.

HARRIET A. NYE.

THE question which of our early spring flowers is entitled to the honor of leading the floral procession is one which has been frequently discussed in various parts of New England. I am not aware, however, that there have been printed records regarding the actual dates at which the Hepatica and other early flowers bloom in central Maine. I submit, therefore, the following memoranda for comparison with the notes of other observers interested in the first appearance each year of these fore-runners of spring.

There is upon our farm a small, sunny opening, somewhat sheltered upon the north and west by woods. It is overgrown by scattered sumachs and blackberries and throughout the season yields numerous treasures to the botanist. In early spring it is a veritable flower garden and it is here that we find our earliest Hepaticas and Erythroniums. We are obliged, however, to go some distance from home for Arbutus.

The first spring flowers to greet us in 1893 were the Hepaticas, in full bloom April 19. I fail to find dates recorded in the year 1894 but in that year both the Hepatica and the Arbutus were rivaled in earliness by a dainty flower much less familiar because quite rare. While searching for Arbutus by the Messalonskee in Waterville the latter part of April, I unexpectedly came upon a few clusters of delicately fragrant whitish flowers the like of which I had never seen before nor have I since. It was plainly a member of the numerous and puzzling order Compositae but the absence of leaves baffled all

attempts at identification. Several weeks elapsed before I learned that it was the Sweet Coltsfoot, *Petasites palmata*. I found no Arbutus that day,— it was too early for them, — but I was satisfied.

The following year, 1895, the frail little Bloodroots were the harbingers of spring, blooming upon a lawn in Waterville, April 18. Hepaticas, however, were in full bloom by the roadside the following day, April 19. I heard of others finding Arbutus as early as April 18, but did not find them myself until April 28.

In 1896 Hepaticas bloomed April 21, followed two days later by Arbutus and by Yellow Erythroniums on the 24th.

In 1897 Hepatica buds were secured on the 12th of April, which bloomed in the house on the 15th. They were found in bloom out-of-doors April 19.

In 1898 Hepaticas bloomed out-of-doors on Easter, April 10. I also had Erythroniums in bloom April 13 of that year.

April 15 was the date on which Hepaticas were first found in bloom in 1899. By the 27th of the month Hepaticas and Erythroniums were passing their prime, and Trilliums, White Violets and Strawberries were in bloom.

In 1900 Hepatica buds gathered April 6, bloomed in the house April 10, while they were in full bloom in the open April 19, closely followed by Erythroniums on the 20th.

Last year, 1901, Hepaticas were in full bloom on the 16th of April, while this year they have broken the record by appearing in March. Clusters of buds removed to the house March 22 bloomed on the 26th, and were in prime condition upon our early Easter, March 30. While it must be admitted that these were 'forced,' yet large, magnificent ones, as fine as any I ever saw, were gathered in the field on April 2. Arbutus buds, very small indeed, yet showing signs of growth, were gathered April 1 and placed in water. To-day, April 5, some of them are bursting into bloom.

FAIRFIELD CENTER, MAINE.

TWO MORE RARE PLANTS FROM LAKE ST. JOHN, QUEBEC.— It was my good fortune last August to find a specimen of *Carex Katahdinensis*, Fernald, at "The Grand Discharge" or main outlet of Lake St. John. This, I believe, is the first time this new species has been found, aside from the original station at Mt. Katahdin

(see RHODORA iii. 171, June, 1901); and we may hope that the plant will turn up elsewhere in the northeastern provinces of Canada. At the Grand Discharge it was found in thin soil among bushes near the high water mark of the river.

The water of Lake St. John seemed to be last August unusually low, nearly twenty feet below the level of the spring floods. On the sandy bottoms of small bays, and on muddy shores of islands thus exposed, there occurred an abundance of *Juncus subtilis*, E. Meyer, (see RHODORA, iii. 228, September, 1901). It grows sometimes in broad dense mats with crimson foliage and numerous flowers; at other times in colonies of single individuals more strongly repent, with green foliage and fewer flowers. It did not remind me at all of *Juncus pelocarpus*, which also occurs in this region; it is surely a well-marked species. At Lake St. John it was in such select company as *Subularia aquatica*, L., *Littorella lacustris*, L., *Ranunculus Flammula*, L., var. *reptans*, E. Meyer. It is of interest to note that the plant was first observed by Michaux at Chicoutimi, fifty miles further down the Saguenay River.—EZRA BRAINERD Middlebury, Vermont.

SOME VERMONT AND NEW HAMPSHIRE PLANTS IN THE MIDDLE CONNECTICUT VALLEY,—I.

W. H. BLANCHARD.

THE territory which the writer has examined somewhat thoroughly is the eastern half of Westminster and Putney and the village of Bellows Falls in Vermont, and in New Hampshire that part of Walpole which is adjacent to Bellows Falls and the northern part of Westminster. The whole of Windham County is in his field, however. Readers interested in this region may well examine in connection with these notes the article by Mr. Fernald in RHODORA, iii. 232. Conclusions may be drawn later regarding the region. In this article trees and shrubs only are considered.

Menispermum canadense, L. Moonseed. Two stations on the bank of the Connecticut River in Westminster. Reported but once north of this, namely by Dr. Barrows at Claremont on both sides of the Connecticut.

Lechea minor, L. Vernon, Vermont; in a pastured mowing about a mile northeast of South Vernon Station. First time reported north of Hingham, Massachusetts.

Xanthoxylum Americanum, Mill. Prickly Ash. One station where it is native. As it is known to our "Root and herb doctors" it must be found occasionally.

Ceanothus Americanus, L. New Jersey Tea. Frequent on dry, sterile terrace banks of the Connecticut River. I have never seen it in any other place. It is reported northward to Olcott Falls.

Vitis bicolor, LeConte. Summer Grape. Occasionally found at the foot of cliffs from Fall Mountain opposite Bellows Falls to Vernon. Evidently near its northern limit.

Vitis Labrusca, L. Fox Grape. This species is native around the lily-pond in Vernon, and may be so on the railroad as far north as Central Park Station. It occurs in other places also, but as an escape from cultivation.

Acer saccharinum, L. (*A. dasycarpum*, Ehrh.). River or Silver Maple. This is abundant where its roots can reach the water of the Connecticut River, but it is rarely seen elsewhere.

Acer Negundo, L. Box Elder. This has become naturalized on the banks of the Connecticut River. It is abundant on the New Hampshire side just below the fall at Bellows Falls in "Dr. Goodell's Orchard" and is occasionally found in Westminster and below.

Staphylea trifolia, L. Bladder-nut. Abundant in spots on the bank of the Connecticut River. There are at least two stations in Westminster.

Rhus copallina, L. Margined Sumach. This Dwarf sumach is abundant in places for a mile from the Connecticut River. Prof. Jesup records it as rare in his region, which reaches nearly down to Bellows Falls.

Rhus glabra, L. Smooth Sumach. Frequent in the range of the Margined Sumach.

Rhus venenata, L. Poison Sumach. Abundant in Vernon swamps and less frequent farther north.

Prunus pumila, L. Sand Cherry. On the sandy shore of the Connecticut River at Dr. Goodell's orchard and Brattleborough. At Vernon it is found on the dry plain away from the river.

Rosa blanda, Ait. River or Smooth Rose. Abundant on the bank of the Connecticut River in Westminster. Reported also at Hanover, New Hampshire, and Fairlee, Vermont.

Rosa Carolina, L. Swamp Rose. Scarce; Rocky Hill Swamp, and Lily-pond Swamp, Westminster.

Pyrus arbutifolia, L. Red Chokeberry. (See RHODORA, iv. 55.)

Cornus circinata, L'Her. Round-leaved Dogwood. Frequent. Abundant on Fall Mountain. Jesup reports it only at Hanover, New Hampshire, and Hartford, Vermont.

Cornus paniculata, L'Her. Frequent in the northern part of Walpole and Westminster. Jesup reports it as rare and gives two stations, Charlestown and Plymouth, New Hampshire.

Nyssa sylvatica, Marsh. Pepperidge. Rocky Hill, Westminster, where only staminate trees grow, and on Fall Mountain, Walpole; also in Vernon. Jesup reports it only near Squam Lake, New Hampshire.

Viburnum Opulus, L. High Cranberry. Rare. Occurs as a low bush in Lily-pond Swamp, Westminster.

Lonicera glauca, Hill. Frequent in the northern parts of Walpole and Westminster, the only stations seen.

Cephalanthus occidentalis, L. Button-bush. Common in this region, but reported as less so further north.

Gaylussacia resinosa, Torr. & Gray. Huckleberry. Abundant on Fall Mountain and farther south; frequent in this region generally. The var. *glaucocarpa*, Robinson, occurs on Rocky Hill, Westminster, the only station yet reported in Vermont, and on Fall Mountain, Walpole, New Hampshire.

Vaccinium vacillans, Solander. Half-high Blueberry. Frequent. Reported as rare northward. Jesup gives three stations.

Andromeda ligustrina, Muhl. Common in Windham County, Vermont. This seems to be its northern limit. Jesup gives as stations for this plant only Sunapee Lake and Enfield, New Hampshire.

Kalmia latifolia, L. Mountain Laurel. In spots in the Connecticut Valley, one in Dummerston, one on Rocky Hill, Westminster, and one in the northern part of Rockingham. Sargent found it at Squam Lake. It occurs on the bank of West River from Brookline to Brattleboro.

Rhododendron canescens, Don. Mountain pink, Swamp pink. Abundant on dry banks on both sides of the Connecticut River about Bellows Falls; also occasional in swamps and on dry banks. Pastures in Stratton, Vermont are filled with it.

Ledum Groenlandicum, Oeder (*L. latifolium*, Ait.) Labrador Tea. Grout's Pond, Stratton, Vermont.

Sassafras officinale, Nees. Frequent from Bellows Falls southward in the immediate Connecticut Valley, where it makes considerable trees. Reported rare further north.

Lindera Benzoin, Blume. Spice-bush. Plentiful on two little brooks on the line between Putney and Westminster one-half mile from the Connecticut River. This is quite likely to be the northern limit. Prof. Jesup informs me that he has no trace of it. It grows in open pastures and kills back very badly, so that it seldom reaches four feet in height.

Dirca palustris, L. Wickopy. Scarce. Brook bordering the south side of Drewsville Plain, Walpole, and two stations in Westminster. If it were not scarce choppers would know of it, but they never do.

Celtis occidentalis, L. Hackberry. Four scattered trees on the bank of the Connecticut River, in Westminster. Reported as occasional to Wells River.

Platanus occidentalis, L. Buttonwood. Frequent on the banks of streams and apparently native.

Carya alba, Nutt. Shagbark. Occurs in spots from Charlestown, New Hampshire, southward, generally on rocky knolls and seldom more than a mile from the Connecticut River. Reported as far north as Windsor, Vermont.

Carya amara, Nutt. Pignut. This yellow-budded walnut and the one preceding it are the only ones seen in this region. Frequent in the Connecticut Valley.

Betula populifolia, Ait. Gray Birch. Perhaps this species attains its northern limit in Walpole and Westminster, where it is not rare. Abundant on Westminster Lower Street. Flint reports its northern limit as Westmoreland, New Hampshire.

Corylus Americana, Walt. Hazelnut. Abundant around Bellows Falls, but rare in Westminster and Putney. The beaked hazel, *C. rostrata*, Ait. is common.

Carpinus Caroliniana, Walt. Blue Beech. Frequent in the immediate valley of the Connecticut River.

Quercus alba, L. White Oak. Abundant, but seldom seen more than two miles from the Connecticut River.

Q. velutina, Lam. Black or Yellow Oak. Bark black outside, yellow inside. Abundant about Bellows Falls on both sides of the Connecticut River. Less frequent southward in Westminster and Putney. Same range as the white oak.

Q. ilicifolia, Wang. Scrub Black Oak. Around Bellows Falls on both sides of the river. It is quite likely that this is its northern limit. Reported at Brattleboro.

Q. prinoides, Willd. Abundant on the west face of Fall Mountain opposite Bellows Falls. None of this species has been found on the Vermont side of the river.

Castanea sativa, Mill., var. *Americana*, Gray. Chestnut. Grows in spots only, never scattered. These spots are few and near the Connecticut River. There is only one of them between Bellows Falls and Brattleboro. The northern limit of the species is reported at Claremont, New Hampshire, and Windsor, Vermont.

Populus deltoides, Marsh. Necklace Poplar. Grows close to the Connecticut River. Flint reports it as occurring no farther north than Westmoreland, but there are scattered trees as far north as Dr. Goodell's orchard opposite Bellows Falls. Here there is a staminate tree nearly five feet in diameter.

Pinus resinosa, Ait. Norway Pine. Drewsville Plain, Walpole, is the only locality where this species has been seen.

Juniperus communis, L., var. *Canadensis*, Loud. Plants covering a space from two to thirty feet in diameter occur quite frequently in Putney and Westminster. The species constantly appears in new places.

Juniperus Virginiana, L. Red Cedar. Formerly scarce, but trees are now springing up in most of the pastures of Putney and Westminster, although as yet dwarfish.

WESTMINSTER, VERMONT.

THE SENECA SNAKEROOT IN MAINE. — Several years ago Miss Kate Furbish informed me that she had examined undoubted material of *Polygala Senega* collected by Miss Electra C. Teague at Caribou, Maine. Upon this report the record of the species as a Maine plant has rested for ten years, although a specimen from Aroostook Falls, New Brunswick, in the same valley with Caribou, has long been in the Gray Herbarium. In September, last, while botanizing upon the gravelly terraces of the Aroostook River, at Fort Fairfield, Maine, I found the species locally in great abundance. Examination showed the plant to extend over a large strip of undisturbed terrace below the village, but to disappear as soon as the cultivated land was reached. It is thus probable that, prior to the

general clearing and cultivation of the alluvial belt near the Aroostook River, the Seneca Snakeroot was a common plant in the valley. — M. L. FERNALD.

CLATHRUS COLUMNATUS IN LAWRENCE, MASSACHUSETTS. — In November of last year Mr. F. H. Silsbee of Lawrence wrote me a description of a strange phalloid which had appeared in a flower pot that contained an oleander tree. He took it to be a columnar Clathrus — a tropical fungus which would not be expected to appear naturally in Massachusetts. The specimen which he described was somewhat damaged, and evidently had not secured its full and normal growth. Moreover, as sometimes happens with phalloids, the upper portion of the volva remained rather firmly attached to the upper part of the specimen, and somewhat obscured its features. Mr. Silsbee wrote in substance that "there were apparently five arms, porous, like *Mutinus caninus*. The lower part of the volva still showed a whitish, firm jelly, and apparently had a thin membrane originally extending in between the arms. The yellowish olive colored slime of the gleba contained oval spores about 5 by 2 μ. The odor like all of this class, was disgusting and sickening, but not nearly so powerful as that of Dictyophora. I presume this must be a Clathrus, but it was simply columnar without any trace of lattice work. It had been growing above ground some five or six weeks, but split open only a day or two before it was brought to me. There is another small one already started, which I will send you if it is of interest."

Nearly three weeks elapsed before I received this second specimen. It was not two inches long, had only three complete columns, and was still less perfectly developed than the first. There could be little hesitation, however, in referring the fungus to *Clathrus columnatus* Bosc, a tropical species, which is common also in Florida. A full treatment of it may be found in Dr. E. A. Burt's second paper on "The Phalloideae of the United States,"[1] from which the following is adapted.

Receptaculum consisting of 2 to 5 massive vertical columns separate below but joined together at the apex; columns cinnabar-red; gleba suspended from underneath the apex of the receptaculum. Odor very fetid. Plant 2 to 5 in. high. Growing in sandy soil.

[1] Botanical Gazette, XXII, 5, Nov. 1896, p. 388.

Reported from North Carolina, South Carolina, Georgia, Florida and Texas.

The variation in the number of columns has given rise to various species, of which Dr. Burt gives an extensive synonymy. Some of these appear under the generic name Laternea, a designation made to separate species with a columnar receptaculum from those in which it consists of anastomosing bars which form a large-meshed net-work, as in *Clathrus cancellatus* Tourn., an old world species of wide distribution, which has been found in the United States as far north as New York.

I have recently seen a colored drawing of a large specimen of *Clathrus columnatus* made in Florida by Mrs. A. M. Hadley of Manchester, New Hampshire, who kindly allowed a number of her admirable drawings of fungi to be exhibited at a meeting of the Boston Mycological Club. According to her observation, the species was common, and was easily discoverable in the woods by the simple method of following one's nose. — H. Webster.

TWO NEW HYPERICUMS OF THE ADPRESSUM GROUP.

B. L. Robinson.

(Plate 37.)

From Mr. C. H. Bissell I have recently received an interesting Hypericum with the habit of *H. adpressum*, Bart. The plant is represented by two specimens, both showing flowers and early stages of the fruit as well as habit and foliage. They were found by Mr. Bissell on the Alcott Road, Southington, Connecticut. The most striking feature in which the plant differs from *H. adpressum* is the great breadth of the sepals, but examination shows other differences also, such as the number of stamens, the close punctation of the leaves, and the unintruded placentae. The stamens are much more numerous than in *H. adpressum* and are not separable into phalanxes as in that species. Efforts to place this plant in any other hitherto described species have failed and it seems best to describe it as new. It is a pleasure to dedicate the species to its discoverer, one of the most alert and careful amateur botanists in New England. The plant may be characterized as follows.

HYPERICUM **Bissellii.** Perenne herbaceum 4–5 dm. altum erectum glaberrimum; caulibus foliosis simplicibus vel in parte superiori plus minusve ramosis basi flexuosis teretibus a cortice brunneo tectis supra ancipitibus flavescentibus: foliis oblongis integerrimis erectis vel adscendentibus sessilibus in axillis proliferis obtusiusculis 2.5–3.5 cm. longis 3–5 mm. latis uninervis supra saturate viridibus non lucentibus subtus pallidi oribus creberrime punctatis: cymis terminalibus regulariter dichotomis 8 cm. latis circa 20-floris; ramulis patente adscendentibus; bracteis ovatis, acutis 7–10 mm. longis; floribus in dichotomis solitariis erectis ad 1.5 cm. latis; pedicellis 2–4 mm. longis; sepalis valde inaequalibus, maximis late ovatis 1.3 cm. longis 8 mm. latis acuminatis subcordatis herbaceis 3-nerviis creberrime punctatis et basi pellucide glanduloso-lineatis; petalis obovato-oblongis obliquis apice rotundatis sed in latere uno cum mucrone pusillo munitis flavis 7 mm. longis; staminibus pernumerosis in phalanges non separabilibus; carpellis 3, styli ramis in maturitate profunde divisis, capsula ovoidea acuminata 7 mm. longa uniloculare, placentibus 3 parietalibus nullo modo intrusis.—Collected by C. H. Bissell at Southington, Connecticut, 30 July, 1901, no. 4025. Type in the Gray Herbarium.

On the 15th of September, 1901, Dr. G. G. Kennedy, Mr. E. F. Williams, and Mr. M. L. Fernald collected on the sandy shores of Flax Pond, at Bourne, Massachusetts, two forms of *Hypericum adpressum* so different in biological character as to merit taxonomic recognition. In the one which corresponds to the typical form of *H. adpressum*, Bart. the rootstocks are relatively slender and repent sending up two or more stems from near the tip. The cortex is not at all spongy-thickened. and the leaves are linear to narrowly lanceolate-oblong and of a bright green color. The other plant may be described as follows.

H. ADPRESSUM, var. **spongiosum.** Quam forma typica robustius erectum 7 cm. altum; caule solitario in parte inferiori incrassato et more Decodonis a cortice crasso spongioso tecto; foliis oblongis quam illi formae typicae latioribus et saturiore viridibus.—Collected by G. G. Kennedy, E. F. Williams, and M. L. Fernald, in marshy borders of thickets on the sandy shores of Flax Pond, Bourne, Massachusetts, 15 September, 1901. Type in the Gray Herbarium.

Both of these forms were secured in considerable quantity and comparisons have embraced some two hundred specimens. Although collected late in the season the specimens show all the floral parts even occasional petals. Careful search, however, has failed to reveal any differences in the floral organs, fruit, or seed; and as the vegetative differences although marked do not appear to be entirely constant, it seems best to treat the new form as a variety rather than a species. That it does not represent merely a stage of development in the typical plant is sufficiently shown by the fact that both forms, grow-

ing near together, fruit simultaneously. It is probable that these are ecological varieties, that is, forms responding in a marked manner to environmental influences even during the development of a single generation. This would be difficult to prove except by cultures.

The differences are well shown by the accompanying plate, kindly drawn by Mr. F. Schuyler Mathews.

EXPLANATION OF PLATE 37 — *Hypericum Bissellii*: fig. 1, habit; fig. 2, expanded calyx; fig. 3, petal; fig. 4, cross-section of the ovary. *H. adpressum*: fig. 5, part of the stem; fig. 6. branched base; fig. 7, petal; fig. 8, expanded calyx; fig. 9, cross-section of the ovary; *H. adpressum*, var. *spongiosum*; fig. 10, part of the stem; fig. 11, spongy base of stem.

AN ANOMALOUS SKULLCAP.

M. L. FERNALD.

(Plate 38.)

JUDGE J. R. CHURCHILL has called the attention of the writer to a peculiar *Scutellaria* collected by him on the beach of the Aroostook River at Fort Fairfield, Maine. The plant was gathered as *S. galericulata* and a single specimen only was taken "for locality." A plant essentially identical with Judge Churchill's Fort Fairfield material had previously been collected by the writer in river-thickets at Masardis, seventy-five miles further up the Aroostook than Fort Fairfield. This material was passed without examination as *S. lateriflora*, but subsequent study of it in connection with the Fort Fairfield plant shows it to be of more than ordinary interest.

Its showy blue-violet flowers in the axils of the large leaves, though smaller than in that species, immediately suggest *S. galericulata*; but the thin primary leaves are ovate, long-acuminate, coarsely crenate-dentate, and on slender petioles, thus closely simulating those of *S. lateriflora*. This Aroostook River plant is, therefore, essentially intermediate in its characters between the two common species of New England. Combining thus the characters of two species the plant may be of hybrid origin. Yet the independent collection of specimens at remote points and in each case merely "for locality" suggests that the plant is common throughout the Aroostook Valley, and is to be regarded as analogous to certain other New England species,— *Circaea intermedia*, *Apocynum medium*, *Lysimachia producta*,

Lactuca Morssii, etc.— which combine to some extent the tendencies of other species of their respective genera.

The characters of this Aroostook Valley plant with which it is a pleasure to associate the name of the indefatigable botanical collector who first noted its peculiarities, are: —

SCUTELLARIA **Churchilliana**. Stems ascending from a slender rootstock, 3.5 to 6 dm. high, minutely pilose, freely branching even from the very base; the branches simple or forked, flexuous, loosely ascending or spreading, mostly 1.5 to 3 dm. long: leaves ovate-acuminate, very thin, glabrous above, minutely pilose on the nerves beneath; those of the primary stem 4 to 6 cm. long, coarsely crenate-dentate, on slender petioles nearly 1 cm. long; those of the branches smaller (1.5 to 3.5 cm. long) diminishing upwards, less coarsely toothed and on shorter petioles: flowers solitary in the upper axils: pedicels 1 or 2 mm. long: calyx during anthesis, 2.5 to 3 mm. long, puberulent: corolla 1 to 1.5 cm. long, pilose, blue-violet, narrow-funnelform, gradually enlarged upward, the lower lip somewhat exceeding the galea. — MAINE, thicket by Aroostook River, Masardis, Sept. 8, 1897 (*M. L. Fernald* — type in Herb. Gray); beach of Aroostook River, Fort Fairfield, Aug. 11, 1901 (*J. R. Churchill*).

In plate 38, Mr. F. Schuyler Mathews has brought out the habital distinctions of the three species here discussed.

GRAY HERBARIUM.

EXPLANATION OF PLATE 38.— Fig. 1, upper portion of *Scutellaria Churchilliana*; fig. 2, upper node of *S. lateriflora*; fig. 3, upper node of *S. galericulata*.

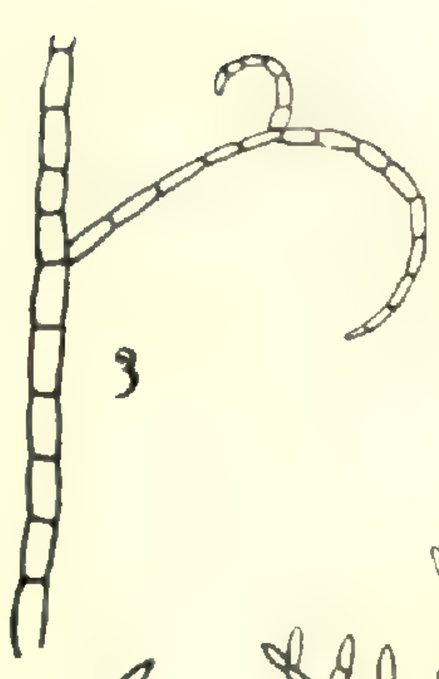
THE VERMONT BOTANICAL CLUB will join the VERMONT BIRD CLUB in a field-meeting on the shores and islands of Lake Champlain, Thursday and Friday, July 3 and 4.

The plan is to make cruises in small steamers to the less accessible points about the lake, leaving Burlington at 8 A. M., July 3, and returning on the evening of July 4. But since it is necessary to know in advance the number who will make the cruise, all persons who are interested in the meeting should apply *at once* to Prof. L. R. Jones, Secretary, Vermont Botanical Club, Burlington, Vt., for a circular giving detailed information.

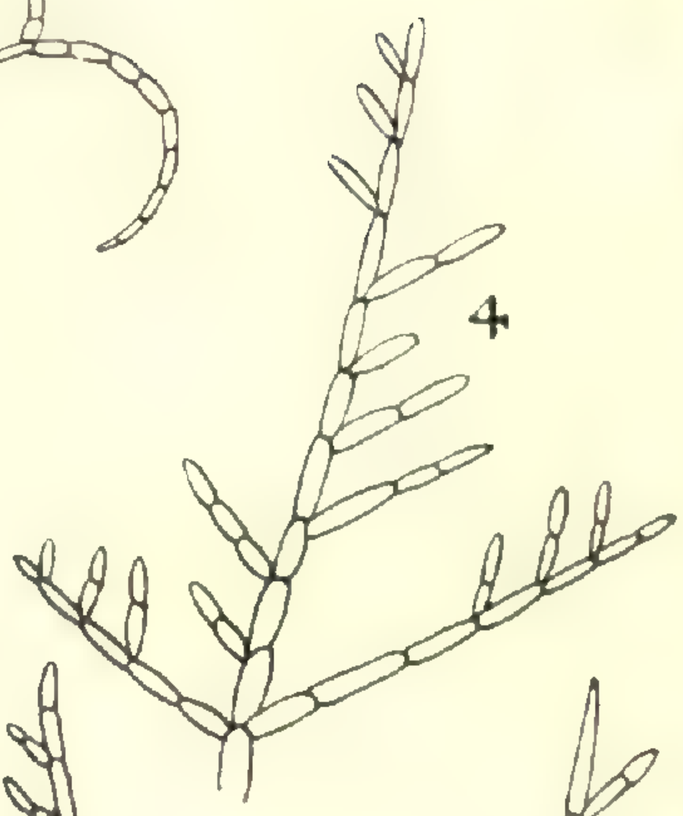
Vol. 4, no. 41, containing pages 87 to 110, was issued 9 May, 1902.

1

2

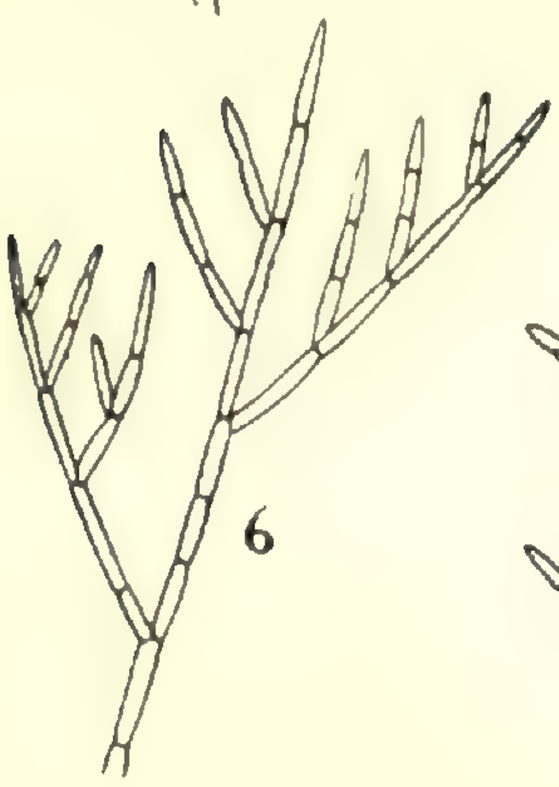


3



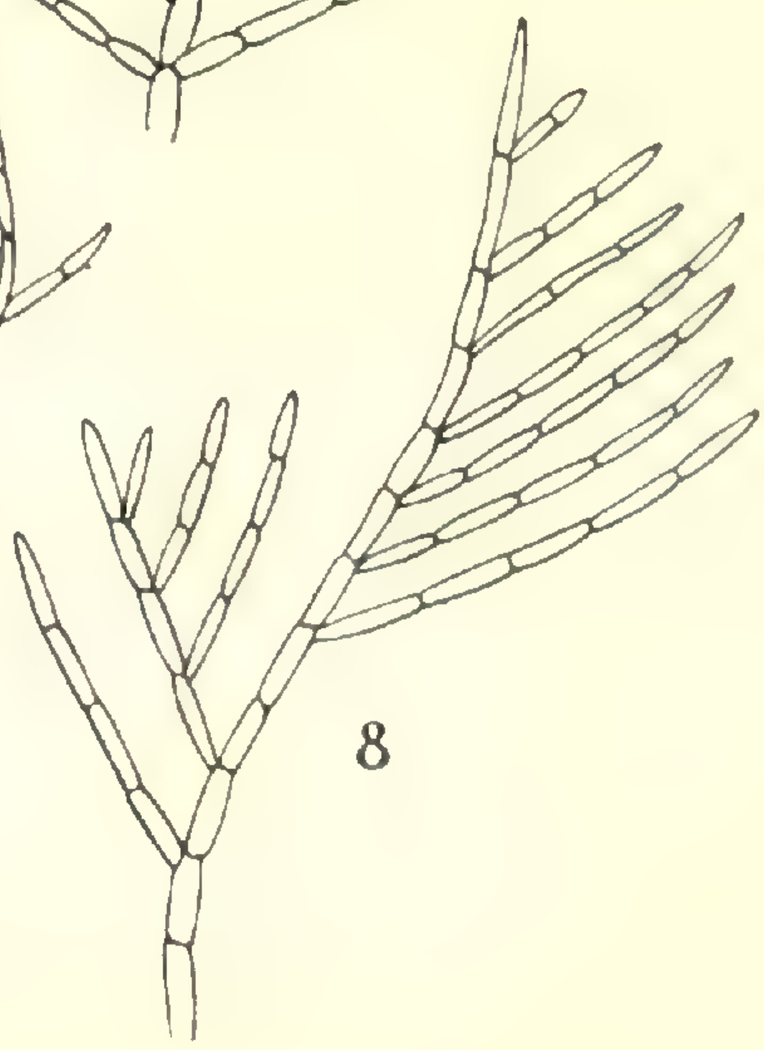
4

5

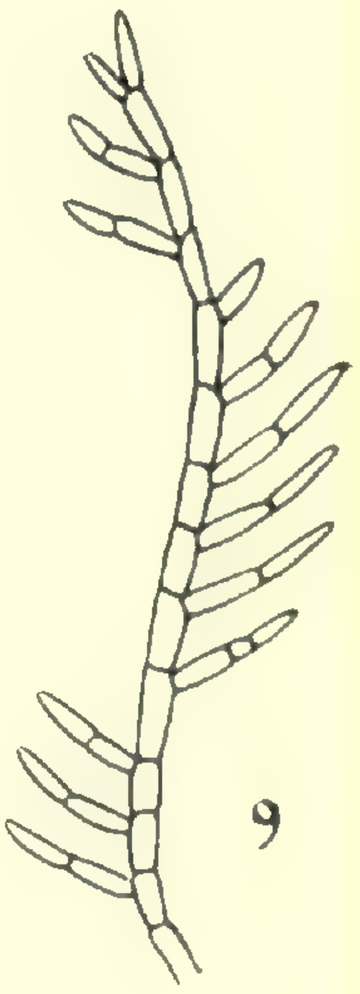


6

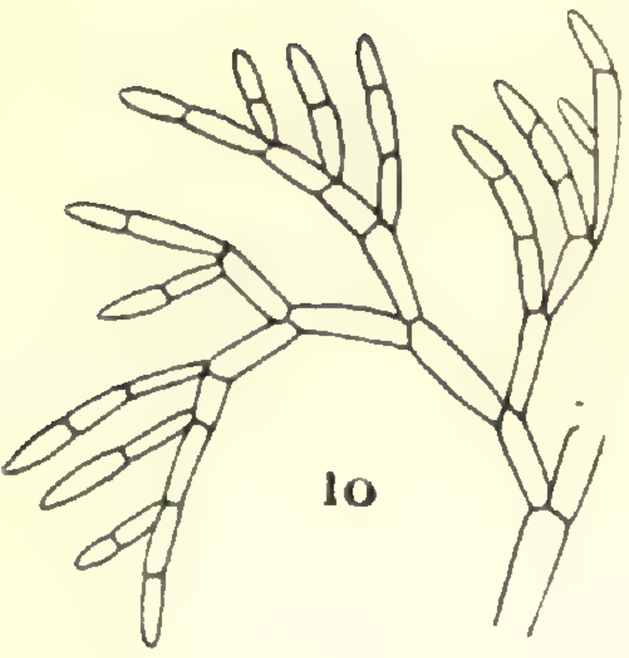
7



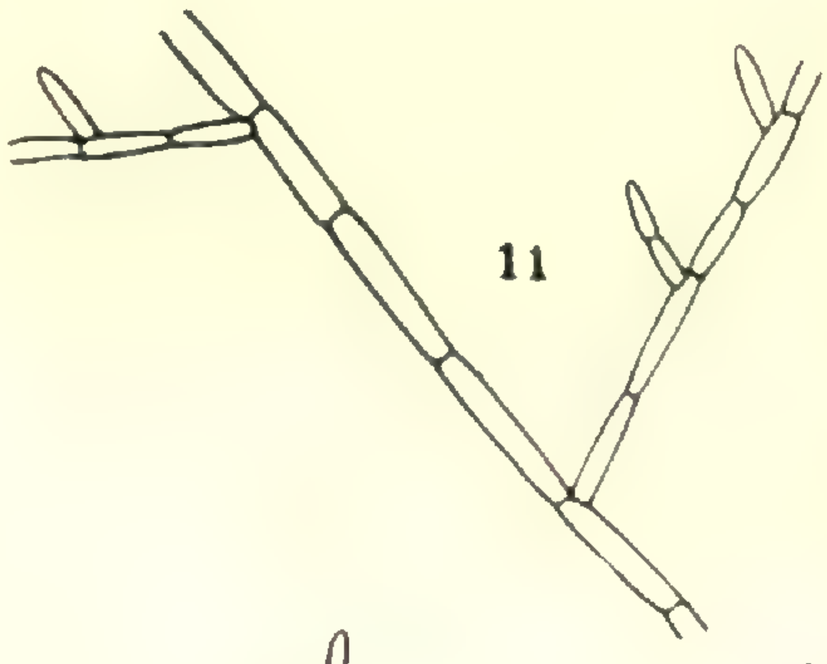
8



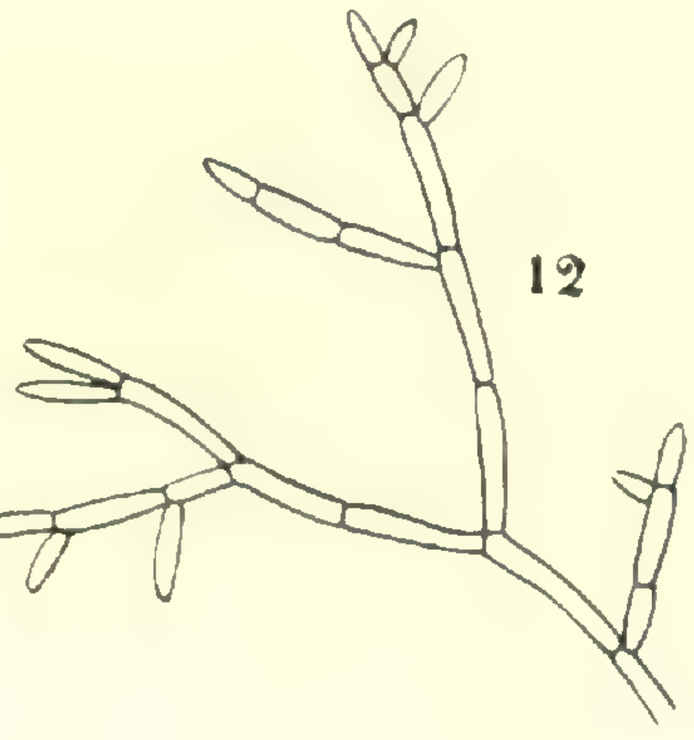
9



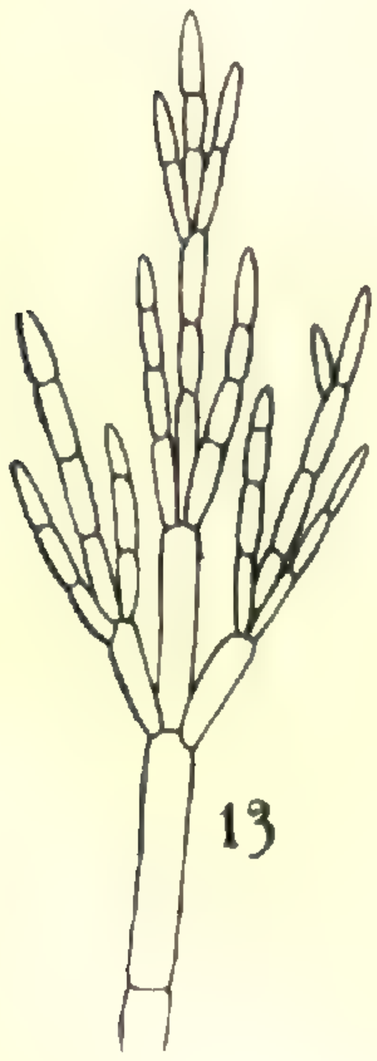
10



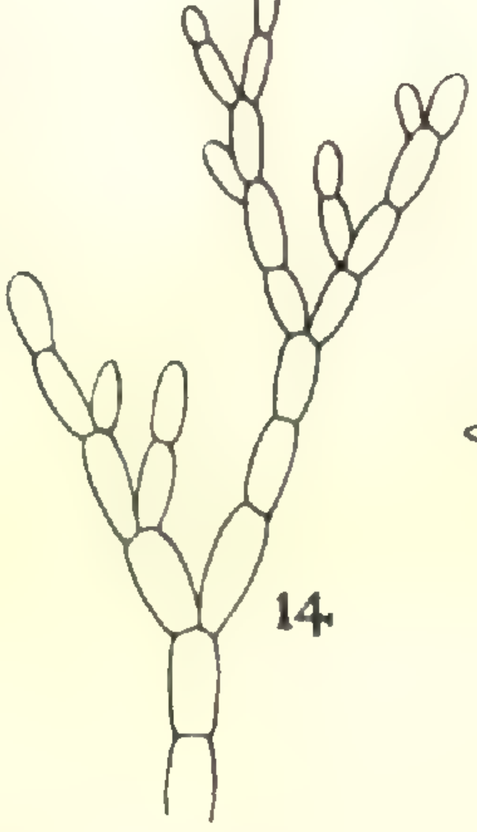
11



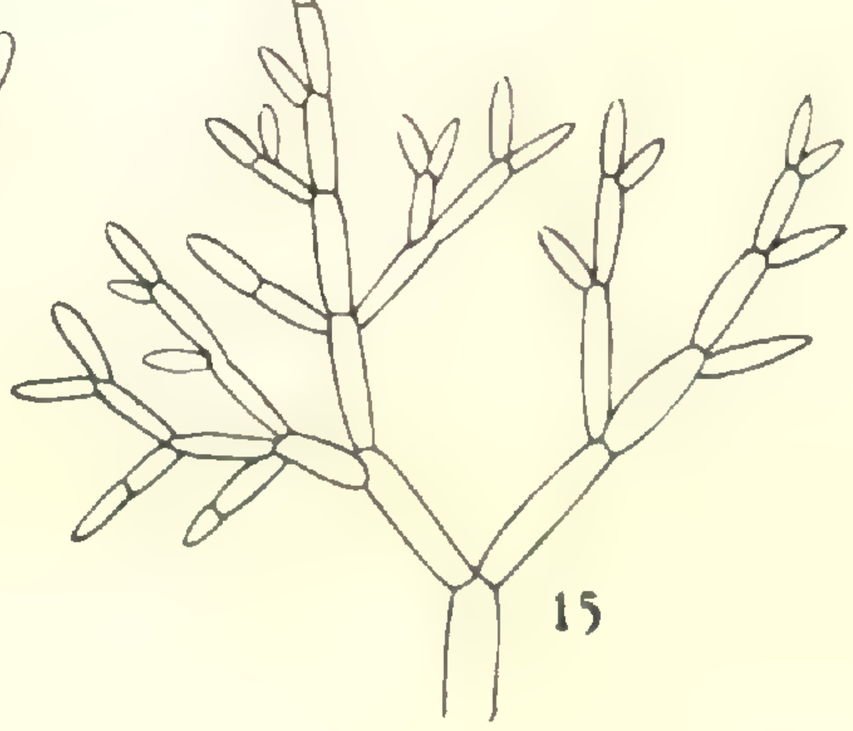
12



13



14



15

NEW ENGLAND CLADOPHORAS.

F. Schuyler Mathews del.

Figs. 1–4, *Hypericum Bissellii*; figs. 5–9, *H. adpressum*; figs. 10–11, *H. adpressum*, var. *spongiosum*.

F. Schuyler Mathews del.

Fig. 1, *Scutellaria Churchilliana*; fig. 2, *S. lateriflora*; fig. 3, *S. galericulata*.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 July, 1902 No. 43

THE PROTECTION OF OUR NATIVE FLORA.

B. L. Robinson.

The Society for the Protection of Native Plants has already surpassed the hopes of its founders in the breadth of its influence and the extent of interest and sympathy, which it has aroused. Its work has a national scope and already the Society enrolls members in fifteen states and in Canada. Many thousands of its brief leaflets, well written, moderate in their tone, and convincing in their appeal have been distributed. They have gone to libraries, teachers, members of botanical and horticultural societies, village improvement associations, park-commissioners, flower missions, and especially to school children. It is impossible to doubt that these circulars have brought new ideas to many hundred flower pickers, who thus cautioned will be more than willing to abate any excesses which they may have been thoughtlessly committing in the destruction of our attractive native plants. Newspapers have given their editorial approval to the work of this society and it is most encouraging to see that, stimulated doubtless by this example, other associations have been formed to further the same good cause. Thus there is reason to congratulate the Society for the Protection of Native Plants upon an excellent work well begun. The desire now is that the activity may be unremitted and that it may be continuously directed along wise and practical lines. While pure sentiment and aesthetic instincts may well be appealed to in this work, it is obvious that the movement will be harmed rather than aided by effusions which are merely sentimental and not founded upon carefully ascertained facts.

The greatest need of the Society for the Protection of Native Plants is at present accurate information from many sources regarding

the actual nature and extent of the depredations, which it is its object to prevent. That much needless destruction of our more attractive plants is constantly going on, cannot be doubted. That much of this irreparable loss can be obviated, few will wish to deny. Nevertheless, modes of practical procedure are as yet difficult to determine owing to the vagueness of the information obtainable regarding the particular places and plants requiring attention.

Of plants, which are reported as having been exterminated in certain localities, the majority prove on investigation to be those which were once known in the vicinity of large and growing cities. In regard to most of these cases it is evident to the thoughtful that the destruction of the native vegetation is due only in a minor degree to flower pickers. It is far more the result of perfected drainage, the paving of streets, the extention of squalid suburbs, the tramp of many feet, the demoralizing influences of dust and coal smoke, the dumping of rubbish, and finally the introduction of foreign weeds. It is evident, therefore, that effective portection of the wild flowers in such situations is quite beyond the power and hopes of this Society. Regarding any attractive bits of native vegetation still lingering in the immediate vicinity of our cities, it can only commend them to the legal protection of park-commissioners, urging upon these officials the superior beauty of the wild and natural in comparison with any studied arrangement of exotic shrubs.

But well out from the shadow of the brick and mortar of our great cities the native plants are also being destroyed and in ways so needless that much may certainly be done for their protection. It is far out in the country that the beautiful patches of mountain laurel and holly are being literally hacked to pieces to furnish the quickly passing decorations of winter balls, city weddings and church festivities. It is about our remote summer resorts in the White Mountains, Adirondacks, northern Michigan, and Wisconsin, that the stately paper birches are thoughtlessly stripped of the bark and thus permanently disfigured. It is on Cape Cod that Italian flower gatherers are said to rake together huge bales of trailing arbutus (roots and all), which, brought to the city, yield the innumerable little bunches of flowers purchased on the streets by persons who never suspect the ruthless destruction wrought by this trade. It is on the southern shores of Cape Ann that the botanically interesting station of the *Magnolia glauca* —the only locality for this plant in New England

— has been well nigh destroyed by the transplanting of the trees to the lawns of country residences — a practice the more deplorable since rarely accomplished with success. It may be well to state in this connection that persons desirous of cultivating our native shrubs and vines will succeed much better if they obtain thrifty and well selected stock from some reliable nurseryman than if they attempt to transplant specimens secured in the woods. There are several well-known reasons for this; one is, that the nursery stock has in general been raised in soil and environment nearly approaching that in which the plant is likely to be placed, while on the other hand it is usually difficult to reproduce the exact conditions in which the wild plant has grown. Furthermore, the skilful nurseryman has often selected those forms of our native plants, which experience has shown to develop rapidly and prove hardy. For instance, the writer has observed several Virginia creepers obtained from a nursery and set out along with apparently healthy plants of the same species from the woods. In every instance the nursery stock has in its growth and luxuriance far outstripped the wild plants, the latter remaining relatively low, stunted, sprawling individuals, apparently unable to accommodate themselves to the altered environment. In a similar way wild azaleas and rhododendrons are often dug up and transplanted to gardens and lawns, but rarely with success.

It is evident therefore that the destruction of our native vegetation is of two kinds; in one case it is a deplorable but inevitable result of the increase of population and the extension of our cities, in the other case the injury and depredations are of a nature to be combated vigorously and with a lively hope of success; for they are the result of no grinding and irresistible economic laws nor even of obstinate selfishness but merely of ignorance. The chief aim of the Society is therefore to enlighten. It is in its province for instance to post notices about summer resorts cautioning visitors against the stripping of the birch trees and pointing out the irreparable injury to the tree — a matter seldom realized by the city guest. It is the duty of the Society to inform the public through the newspapers or by its leaflets concerning the extent and seriousness of the destruction, which is yearly wrought to supply street venders with their wild flowers. This like other undesirable trades can be most successfully discouraged by effecting through enlightened sentiment a diminution in the demand rather than by restraints in the matter of supply.

The province of the Society thus being one of instruction its success will depend upon the amount of accurate and pertinent information, which it can accumulate for distribution to the public. It is urged therefore that persons who are in a position to witness needless depredations upon our native plants will kindly communicate the details of such cases to the secretary[1] of the Society. The executive board of the Society is especially desirous of securing accurate data regarding the sources of supply to venders of wild flowers on streets and at railway stations, also the present sources of the mountain laurel, holly, and other Christmas greens, which are brought to our cities in astonishing quantities during the winter season. Information will always be welcomed regarding plants to be especially protected, nature of leaflets which should be issued, places where notices should be posted, and names of persons desiring membership in the Society or willing to sustain or participate in its work.

NOTES ON NORTH AMERICAN GRASSES.

ELMER D. MERRILL.

ORYZOPSIS CANADENSIS (Poir.) Torr. Fl. N. Y. **2**: 433. 1843.
Stipa canadensis Poir. in Lam. Encycl. **7**: 452. 1806; Pursh, Fl. Am. Sept. **1**: 72. 1814.
Stipa juncea Michx. Fl. Bor.-Am. **1**: 54. 1803, non Linn. 1753.
Milium, (sine nomine) Muhl. Gram. 78. 1817.
Milium (?) *muhlenbergianum* Schultes, Mant. **2**: 178. 1824.
Milium pungens Torr. in Spreng. Neue Entd. **2**: 102. 1821; & Fl. U. S. **1**: 78. 1824.
Oryzopsis parviflora. Nutt. Journ. Acad. Nat. Sci. Phila. **3**: 125. 1823.
Oryzopsis juncea B. S. P. Prel. Cat. N. Y. 67. 1888.
Panicum firmum Kunth, Rev. Gram. **1**: 37. 1829–35.
Urachne canadensis Torr. & Gray in Trin. & Rupr. Agrost. **3**: 17. 1842.
Urachne brevicaudata Trin. Mem. Acad. St. Petersb. VI,[2] **3**: 127. 1835.

According to the Rochester rules, *Oryzopsis canadensis* (Poir.) Torr., is the correct name for this species, as it is the earliest available one, Michaux's name, *Stipa juncea*, being invalidated by *Stipa*

[1] Miss M. E. Carter, Boston Society of Natural History, Boston, Mass.

juncea Linn., and *S. juncea*, Lam., and accordingly Dr. Britton erred in taking the name *Oryzopsis juncea*. *Stipa canadensis* Poir. was based on Michaux's *S. juncea*. *Panicum firmum* Kunth, was based on *Milium pungens* Torr., which is certainly *Oryzopsis canadensis*. The descriptions of *Oryzopsis parviflora* Nutt. and *Urachne breviaudata* Trin. certainly apply to *Oryzopsis juncea*. Muhlenberg's description of his *Milium* No. 3, without name (*Milium muhlenbergianum* Schultes) scarcely applies to *Oryzopsis juncea* but is so referred for the present.

MUHLENBERGIA EXPANSA (Poir.) Trin. Uniflor. 193. 1824.

Stipa expansa Poir. in Lam. Encycl. Suppl. 7: 453. 1806.
Trichochloa expansa DC. Hort. Monsp. 151. 1813.
Agrostis rubicunda Bosc. l. c., as syn.
Agrostis trichopodes Ell. Sk. Bot. S. C. and Ga. 1: 135. *pl. 8, f. 1.*, 1817.
Muhlenbergia trichopodes Chapm. Fl. So. U. S. 553. 1860.

There has been some uncertainty as to the identity of *Stipa expansa* Poir., as it has previously been confused with *Agrostis arachnoidea* Poir., which is a synonym of *Muhlenbergia capillaris* (Lam.) Trin. Poiret's full descriptions leave no doubt as to the identity of both these species and his *Stipa expansa* is certainly the species described by Elliott as *Agrostis trichopodes*. DeCandolle and Trinius also have full descriptions of the species in question. As Poiret's name is the oldest available one, it should be taken up for the species now known as *Muhlenbergia trichopodes* (Ell.) Chapm.

DESCHAMPSIA **arctica** (Spreng.).

Deschampsia brevifolia R. Br. Suppl. App. Parry's Voy. 291. 1821, non *Aira brevifolia* Bieb. Fl. Taur. Cauc. 3: 63. 1819; *Aira arctica* Spreng. Cur. Post. 32. 1827; Trin. Mem. Acad. St. Petersb. VI. Sci. Math. Phys. et Nat. 1: 56. 1831.

Recently Mr. Nash[1] correctly considering *Deschampsia brevifolia* R. Br. an untenable name, changed to *Deschampsia brachyphylla*, and extended the range of the species south in the mountains to Montana and Wyoming, overlooking the fact that there was already an available published name for the species, *Aira arctica* Spreng., which was based on *Deschampsia brevifolia* R. Br., and which must be retained for the species.

A careful study of Robert Brown's original description of this species, its geographical distribution and an examination of all available material is convincing of the fact that Mr. Nash erred in his interpretation of this species, and that his *Deschampsia brachyphylla* (*Deschampsia curtifolia* Scribn.) is not at all the plant described by Robert Brown.

There is in the U. S. National Herbarium a specimen from Grin-

[1] Nash in Ryd. Mem. N. Y. Bot. Gard. 1: 37. 1900.

nell Land, collected by Lieut. A. W. Greely in 1883, which we consider to represent Robert Brown's species as it agrees more closely with his description than any other specimens we have seen. This plant represents a most distinct species, and is quite different from the form from the Rocky Mountains referred to *Deschampsia curtifolia*. Greely's plant is figured and described by Scribner, Bot. Gaz. 11: 25. *pl. 3. fig. A.* 1886. *Deschampsia brevifolia* R. Br., was based on specimens from Melville Island, and Greely's plant from Grinnell Land not only agrees better with Brown's description than do the specimens from the Rocky Mountains but also in geographical distribution. Our interpretation of the species may be erroneous, but this can only be decided by examination of the type of the species in the Herbarium of the British Museum; but whether it is like the plant from Grinnell Land or like the Rocky Mountain specimens, *Deschampsia arctica* should be the accepted name for the species.

DESCHAMPSIA CURTIFOLIA Scribn. U. S. Dept. Agric. Div. Agros. Cir. **30**: 7. 1901. (*Deschampsia brachyphylla* Nash in Rydb. Mem. N. Y. Bot. Gard. **1**: 37. 1900, excl. syn., non Philippi, Anal. Univ. Chile, **94**: 23. 1896; *Deschampsia caespitosa setifolia* Griseb. in Ledeb. Fl. Ross. **4**; 421. 1853, non *Deschampsia setifolia* Koch, Syn. Fl. Germ. 914. 1837; *Aira media* Trin. Mem. Acad. St. Petersb. VI. Sci. Math. Phys. et Nat. **1**: 57. 1831. p. p.; *Deschampsia caespitosa arctica* Vasey, Descr. Cat. 53. 1885; *Deschampsia caespitosa alpina* Vasey in Beal Grasses N. A. **2**: 368. 1896; *Deschampsia caespitosa brevifolia* Vasey in Beal, l. c. 369, non *Aira brevifolia* Bieb. 1819.)

A densely caespitose form 4 dm. high or less, with numerous narrow basal leaves, very short culm leaves and exserted contracted or spreading panicles 3 to 7 cm. long. Spikelets as in *Deschampsia caespitosa*.

This species extends from Alaska, south to the high mountains of Montana, Wyoming and Colorado, and should perhaps more consistently be considered only as a variety of *Deschampsia caespitosa*, as in ascending the mountains one can find all intergrading forms, the plants gradually becoming smaller as one ascends, the typical form of *Deschampsia curtifolia* being found at the higher altitudes. This plant may be the true *Deschampsia arctica* (Spreng.). (*Deschampsia brevifolia* R. Br.).

ERAGROSTIS CAMPESTRIS Trin. Gram. Suppl. 72. 1836.

Poa nitida Ell. Sk. Bot. S. C. and Ga. **1**: 162. 1817, non Lam. 1791.

Eragrostis nitida Chapm. Fl. So. U. S. 564. 1860.

If this form is to be considered a distinct species, it should be known as *Eragrostis campestris* Trin., which was based on *Poa nitida* Ell., a name invalidated by *Poa nitida* Lam.

POA ARACHNIFERA GLABRATA Vasey Descr. Cat. 81. 1885, nomen; Dewey, Contr. U. S. Nat. Herb. **2**: 546. 1894.

This variety is not valid as it was based on a staminate plant. In the pistillate plants the flowering glumes are constantly profusely webbed at the base, and the keel and lateral nerves are densely pilose below, while in the staminate plants the glumes are entirely glabrous and with only a few webby hairs at the base, or sometimes the hairs are entirely wanting.

POA CUSPIDATA Nutt. in Barton, Fl. Phila. 1 : 61. 1818, excl. syn.
Poa brevifolia Muhl. Gram. 138. 1817, non Gaud. 1808.
Poa pungens Nutt. Gen. 1 : 66. 1818, nec Georgi 1797–1802, nec Bieb. 1808.
Poa brachyphylla Schultes, Mant. 2 : 304. 1824.

Nuttall's name *Poa cuspidata* is the proper one for this species as *Poa brevifolia* Muhl. is antedated by *Poa brevifolia* Gaud. In taking up the names *Poa cuspidata* and *Poa pungens* it was Nuttall's intention to establish a new and more appropriate name for *Poa autumnalis* Ell., but he evidently had a misconception of that species for his descriptions apply not to *Poa autumnalis* Ell., but to *Poa brevifolia* Muhl. Schultes' *Poa brachyphylla* was based on Muhlenberg's *Poa brevifolia*. *Poa cuspidata* Roth, and *P. cuspidata* Baxt., were published later than Nuttall's name, which is the earliest tenable name for the species, now described in our manuals as *Poa brevifolia* Muhl.

POA **ampla** sp. nov. A rather stout, erect, glabrous perennial about 15 dm. high, from very stout rootstocks with linear flat leaves and exserted lanceolate purplish panicles about 2.5 dm. long. Culms glabrous throughout; nodes glabrous; sheaths shorter than the internodes, glabrous; ligule firm, truncate, 2 mm. long; leaf-blades plane, acute, somewhat glaucous, glabrous beneath, scabrous above, those of the culm 1.5 to 2.5 dm. long, about 4 mm. wide, those of the innovations marcescent. Panicles interrupted, 2 to 3 cm. in diameter, the common rachis and the branches erect or ascending, scabrous, fasciculate at the nodes, flower-bearing throughout. Spikelets 7 to 8 mm. long, 3-flowered, much exceeding their scabrous pedicels; empty glumes lanceolate, acute, 3-nerved, scabrous on the keels and nerves, the first 3 to 3.5 mm. long, the second about 1 mm. longer; flowering glumes 4.5 to 5 mm. long, lanceolate, acute, rather prominently 5-nerved, minutely punctate-scabrous throughout and more prominently scabrous on the keels and nerves, basal hairs entirely wanting. Palea nearly equaling the glume, scabrous on the keels.

Type specimen collected at Steptoe, Washington by G. R. Vasey, July 3, 1901, No. 3009.

A peculiar species, related to *Poa nevadensis* and *Poa leckenbyi*, but distinguished from the former by the very prominent rootstocks, plane leaves, short ligule, few-flowered spikelets and more prominently nerved flowering glumes, and from the latter by its scabrous, not pubescent flowering glumes.

PANICULARIA **davyi** sp. nov. A rather glaucous erect perennial

5 to 8 dm. high, with scabrous sheaths, rather harsh flat leaves and elongated contracted or open panicles 2 to 3 dm. long. Sheaths overlapping, minutely retrorsely scabrous, ligule membranaceous, acuminate, about 1.5 cm. long. Leaf blades 1.5 to 2 dm. long, about 6 mm. wide, minutely scabrous. Panicles pale, few-flowered, the common rachis glabrous; branches one or two at each node, 5 to 6 cm. long, ascending or spreading. Spikelets about 1 cm. long, 7 to 9 flowered; empty glumes unequal, the first 1 mm. long, the second about 2 mm. long; flowering glumes 3 mm. long, truncate, prominently nerved, scabrous throughout.

Type specimen collected by J. Burtt Davy, No. 6005, July 21, 1899, marsh near Guerneville, Sonoma County, California.

A peculiar species related to *Panicularia fluitans* (L.) Ktze., and *P. borealis* Nash, but differing from both in its retrorsely scabrous sheaths; also from the former in its smaller flowering glumes and from the latter in having the flowering glumes scabrous throughout.

PANICULARIA **torreyana** (Spreng.).

Poa torreyana Spreng. Neue Entd. **2**: 104. 1821; & Syst. **1**: 346. 1825.

Poa elongata Torr. in Spreng. l. c.; & Fl. U.S. **1**: 112. 1824, non Willd. Enum. **1**; 108. 1809.

Glyceria elongata Trin. Gram. Suppl. 58. 1836.

Sprengel's name, *Poa torreyana*, should be taken up for this species, as *Poa elongata* Torr., is invalidated by Willdenow's earlier published species under the same name.

BROMUS **brachyphyllus** sp. nov. A nearly glabrous, pale green, caespitose perennial 3 to 7 dm. high, with numerous rather short leaves and very small exserted few-flowered panicles. Culms slender, puberulent just below the panicle, and densely pubescent at and for a short distance below the nodes, otherwise glabrous; sheaths shorter than the internodes, glabrous; ligule rather firm, about 2 mm. long; leaf-blades firm, plane, glabrous, lanceolate, acute, 5 to 15 cm. long, 5 to 7 mm. wide; those of the culm 2 or 3, ascending, the basal ones numerous, the older ones marcescent and persistent. Panicles pale, erect, 3 to 9 cm. long, the branches spreading or ascending, mostly one-flowered. Spikelets 1 to 2 cm. long; empty glumes unequal, the first very acute, 1-nerved, about 6 mm. long, much narrower than the second which is 8 mm. long, 3-nerved, and abruptly acute, both minutely pubescent; flowering glumes lanceolate, 10 to 11 mm. long, 7-nerved, sparingly pubescent throughout with mostly spreading white hairs 0.5 mm. long or less, bearing just below the acute apex a slender straight awn 3 or 4 mm. in length.

Type specimen No. 2677, W. C. Cusick, collected in open dry pine forests, Black Butte, Crook Co., Oregon, July 19, 1901.

A remarkable species, at once distinguished from other species in this genus by its comparatively short leaves and very small panicles.

In some respects it approaches *Bromus laevipes* Shear, but is not closely related to that species.

Elymus **aristatus** sp. nov. A rather stout, somewhat glaucous, glabrous, tufted erect perennial about 9 dm. high, with flat leaves; strict erect purplish spikes, subulate empty glumes and awned flowering glumes. Sheaths shorter than the internodes; ligule firm, membranous, about 2 mm. long; leaf-blades 1 to 2 dm. long, about 8 mm. wide, glabrous beneath, striate and somewhat scabrous above. Spikes rather densely flowered, 10 to 14 cm. long, about 5 mm. in diameter, the common rachis scabrous on the margins. Spikelets two or three at each node, 2- to 8-flowered; empty glumes subulate, 0.5 mm. broad at the base, about 12 mm. long, scabrous; flowering glumes lanceolate, 6 to 8 mm. long excluding the awns, sparingly but rather strongly scabrous, tapering into a stout straight scabrous awn which is from 3 to 5 mm. in length.

Type specimen No. 2712, W. C. Cusick, in large clumps, Silver Creek, Harney Co., Oregon, July 31, 1901.

A species closely related to *Elymus triticoides* Buckl., which it resembles in habit of growth, although not at all stoloniferous, but from which it is distinguished by its much longer empty glumes and long-awned scabrous flowering glumes. In the type of *Elymus triticoides* in the herbarium of the Philadelphia Academy of Natural Sciences the empty glumes are from 6 to 8 mm. long and the flowering glumes nearly or quite glabrous, acute, or bearing an awn about 1 mm. in length.

THE CHILIAN EMPETRUM IN NEW ENGLAND.

M. L. Fernald.

In August, 1894, Mr. Clarence H. Knowlton and the writer found on the ledges not far above timber line on Saddleback Mt. at the head of the Sandy River, Maine, a luxuriant Crowberry with large juicy reddish or plum-colored fruit. The berries were much larger than the black fruits with which the writer had been familiar on the eastern coast of Maine; and this difference was further emphasized later in the day when at the "pinnacle" of Saddleback (alt. 4450 ft.) the ordinary *Empetrum nigrum* with coal-black fruit was found. But the matter was given little more attention at the time, although Mr. Knowlton soon after reported the form with plum-colored fruit from the slopes of a lower Mt. Saddleback (2200 ft.) in Perkins Planta-

tion near Wilton and Carthage; and it was noticed by the writer on tablelands and slopes at 1500 to 3000 ft. on various minor mountains of central and western Maine. In fact, from its general distribution on the lower mountains of Maine the plant had come to be looked upon by him as an ordinary form of *Empetrum nigrum* with redder fruit than generally described.

Recently, however, an examination has shown that this reddish fruited Crowberry differs in another character from the black-fruited *Empetrum nigrum*. In the common species of arctic and subarctic Europe, Asia, and America the branchlets are glabrous or at most minutely pulverulent-roughened. In the common form of central and western Maine the branchlets are tomentose or even lanate and the young leaves more or less covered with a loose web of hairs.

A tendency to red fruit is not unknown in the ordinary northern plant with glabrous twigs; and such a plant was described by Rafinesque as *Empetrum purpureum*.[1] His species, however, described as smooth, is apparently a form of *E. nigrum* and not the plant with tomentose branchlets. This latter plant of central and western Maine is represented in the Gray Herbarium by a single sheet from the Bay of Islands, Newfoundland, an old sterile branch collected by Oakes in the White Mts., and a fruiting branch collected by William Boott in Carter Notch, New Hampshire; and it has been collected by Dr. G. G. Kennedy on the slopes of Mt. Washington. Besides these specimens from Newfoundland and New Hampshire no other material from North America, Europe, or Asia is found to match the pubescent plant of interior Maine; while the shrub of the Maine coast, of the summits of Mts. Washington, Clay, Lafayette, and Mansfield, and of Lake Superior, Labrador, and Arctic America agrees with the European *E. nigrum* in having glabrous or at most pulverulent branchlets.

In the Gray Herbarium, however, there are two sheets from the Andes of Chili which in habit, foliage and pubescence closely match the common form from interior Maine. This Chilian plant was described in De Candolle's Prodromus as *Empetrum nigrum* γ *andinum*[2] and it was said to be glabrate, and to have red fruit; but Hooker[3] in discussing the genus had previously treated the Chilian plant as identical with *E. rubrum*, Willd.[4]

[1] New Flora, iii. 50 (1836).
[2] DC. Prodr. xvi. pt. 1, 26 (1869).
[3] Hook. Fl. Antarct. ii. 345 (1847).
[4] Willd. Spec. iv. pt. 2, 713 (1806).

Empetrum rubrum was described from the straits of Magellan and though treated by Hooker as identical with the Chilian plant it was maintained as varietally distinct by De Candolle. Judged by the material of *E. rubrum* from the original region, Tierra del Fuego, Hermite Island, and the Falkland Islands, De Candolle's course seems the wisest, for the Fuegian and Falkland plant is far more pubescent and has much coarser broader and flatter leaves than the Chilian. The latter plant, however, var. *andinum*, De Candolle, as represented by material from the Chilian Andes collected in 1854 by Lechler and in 1860 by Ochsenius has narrower leaves, and these and the young branchlets, which are eventually glabrate, are at first conspicuously tomentose as in the reddish-fruited plant of northern New England and western Newfoundland. With such close identity of characters and with no points by which the two plants can be distinguished the writer feels no hesitation in indentifying the pubescent-branched and reddish-fruited Crowberry of New England with *Empetrum nigrum*, var. *andinum*, DC., of the Chilian Andes.

Upon first thought it seems very extraordinary that identical plants should be found in such remote regions as New England and Chili, especially when no intermediate stations are known. But many similarly striking cases of isolated localities have been discussed in the past. As long ago as 1859 Charles Darwin, extending Edward Forbes's theory of a southern migration of northern types to include transtropical migrations, called attention [1] to the presence at isolated alpine stations in the South American Cordillera and as far south as Tierra del Fuego of plants found in boreal North America and Europe. The same point was more distinctly emphasized by Sir Joseph Hooker in his splendid analyses of the distribution of arctic plants.[2] There he showed that of the 586 Arctic-scandinavian plants recognized by him 40 are known in tropical America and 70 in temperate South America. This remarkable isolation of northern European species in South America was accounted for by the natural path for migration from the extreme North formed by the continuous chain of the Cordillera of western America. During the intensely cold periods preceding or accompanying the Glacial Epoch the plants of northern origin and broad circumpolar distribution found in this

[1] Origin of Species, 373, etc.

[2] Trans. Linn. Soc. xxiii (1861), 251, etc. and in Jones, Man. Nat. Hist. Geol. and Phys. of Greenl. 197, etc.

essentially uninterrupted mountain chain conditions under which they could thrive even in equatorial regions; and among the higher mountains of Mexico, Central America, and the Andes of western South America they still occur in isolated areas just as they do more abundantly on our own New England mountains and coast. Thus it is possible to account for the presence of *Cystopteris fragilis* and *Phleum alpinum* at an altitude of 12000 feet on Mt. Orizaba in southern Mexico;[1] of *Carex capitata* in meadows of the Sierra Madre in Chihuahua; of *Sagina procumbens* among the mountains of Chili;[2] of *Trisetum subspicatum* in the Andes of Peru and at the Straits of Magellan; of *Montia fontana*, *Draba incana*, *Primula farinosa*, *Lycopodium Selago*, *Carex magellanica*, *Cerastium arvense*, var. *fuegianum* (recently identified with a Rocky Mt. plant — see Hollick & Britton, Bull. Torr. Club, xiv. 50) from the Straits of Magellan, the Falkland Islands or adjacent regions;[3] and the many other boreal and arctic plants recorded by Hooker, Gay, and others from extra-tropical South America.

The discovery of *Empetrum nigrum*, var. *andinum* in New England, like that of *Cerastium arvense*, var. *fuegianum* in the Rocky Mts., simply adds, then, one more to this most interesting list of unexpected identities.

As now understood by the writer the characters and American distribution of the two Crowberries is as follows:—

Empetrum nigrum, L. Spec. 1022 (1753). Young branchlets glabrous or at most pulverulent-roughened: berries usually black, rarely reddish when mature. — Greenland and Arctic America, south to the Gulf of St. Lawrence and along the coast to Penobscot Bay, Maine, on the higher mountains to Maine, Katahdin (*Thurber*, etc.), Saddleback (*C. H. Knowlton & M. L. Fernald*), and Baldpate, Grafton (*J. A. Allen*); New Hampshire, Mt. Washington (*Boott*, etc.), Mt. Clay and Mt. Lafayette (*E. F. Williams*); Vermont, Mt. Mansfield (*Eggleston*, etc.); New York, Whiteface (*Rowlee*, *Wiegand* & *Hastings*); Lake Superior (*Houghton*); Washington, Mt. Rainier (*E. C. Smith*, etc.); Oregon, seashore bluffs, Bandon (*Howell*).

E. nigrum, var. andinum, DC. Prodr. xvi. pt. 1, 26 (1869). Branchlets and young leaves tomentose or lanate; berries generally reddish or plum-colored.— Newfoundland, Bay of Islands (*Wag-*

[1] See Hemsl. Biol. Cent.-Am. Bot. iv. 296, 297.

[2] Gay, Fl. Chil. i. 283.

[3] See Hook. Antarctic Fl.

horne); MAINE, rocky slopes and summits of Mt. Katahdin (*Thurber*, etc.), Boarstone — alt. 2000 ft. (*M. L. Fernald*), Squaw — alt. 3000 ft. (*M. L. Fernald*, no. 277), Saddleback, Rangeley — alt. 3500 ft. (*C. H. Knowlton & M. L. Fernald*), Saddleback, Perkins — alt. 2200 ft. (*C. H. Knowlton*), White Cap, Rumford (*J. C. Parlin*), and Speckled Mt., Franklin — alt. 2000 ft. (*J. A. Allen*); NEW HAMPSHIRE, "White Mts." (*Oakes*), Carter Notch (*Wm. Boott*), slope of Mt. Washington (*G. G. Kennedy*); CHILI, higher Andes.

GRAY HERBARIUM.

FURTHER NOTES ON SOLANUM ROSTRATUM AND HIERACIUM PRAEALTUM IN MAINE.— The notes by Mr. O. W. Knight on the appearance east of the Kennebec of *Solanum rostratum* (RHODORA, iii. 276) and *Hieracium praealtum* (RHODORA, iv. 61) may be supplemented by the following observations.

In August, 1900, *Solanum rostratum*, the Buffalo Bur, was noticed in a border of phlox on the campus of the University of Maine at Orono. It was probably introduced there in seed purchased in western New England. The eastern distribution of the Buffalo Bur seems to be almost wholly through commerce; and in Maine it was first detected at Buxton where western grain had been screened.

While visiting the famous station for Mountain Laurel, *Kalmia latifolia*, at Carmel, on July 1, 1898, the writer observed the King-Devil Weed, *Hieracium praealtum*, sparingly established in an adjacent meadow. The following note was made: "Sparsely growing in a meadow with the Mouse-ear Hawkweed, *Hieracium pilosella*, and evidently mistaken for that species." This observation was recorded in an article by the writer on the weeds of Maine and the bad character of the weed was commented upon. In one year it had spread more than had the Orange Hawkweed, *H. aurantiacum*, in twenty. The Carmel station is some twenty miles southwest of that recorded by Mr. Knight; and its observation in Carmel in 1898 supports his supposition "that the plant must have been established in this locality for a number of years to have become so abundant."

This Carmel station furnishes a connecting link between the well-known Gardiner locality seventy-five miles southwest (recorded by D. H. Knowlton in 1895), and the Kenduskeag and Corinth stations of Mr. Knight about twenty miles northeast. These stations indicate a most rapid northeastern invasion of one hundred miles in six years, — an invasion to be regarded with dread by the agriculturist, since

the regal-satanic name but mildly indicates the obnoxious character of the plant.— LEROY H. HARVEY, Hull Botanical Laboratory, University of Chicago.

RANUNCULUS ABORTIVUS, VAR. EUCYCLUS IN HYDE PARK, MASSACHUSETTS.—On June 17, 1900, a few specimens of *Ranunculus abortivus*, var. *eucyclus*, Fernald,[1] were found with the species in a moist shady woodland within the boundaries of the Stony Brook Reservation, Hyde Park, Massachusetts. Specimens are preserved in the herbarium of the New England Botanical Club and in my own herbarium. The Hyde Park locality is apparently the only station reported in Eastern Massachusetts for this plant south of Ipswich. — F. G. FLOYD, West Roxbury, Mass.

THE STAMINATE PLANT OF ANTENNARIA PARLINII.—While Mr. E. F. Williams and I were making a botanical excursion through the northern part of Wilmington, Middlesex county, Massachusetts, on May 18, 1902, we observed by the roadside and in the adjoining fields unusually fine patches of *Antennaria Parlinii*, Fernald, growing with others of the more common species of this genus. A careful search resulted in the discovery of two small clumps of the rare staminate plants. As this form of the species has been reported before from Maine only (RHODORA, i: 156. 1899), and then in much less abundance, this new station is of much interest. Specimens have been placed in the Gray Herbarium and the Herbarium of the New England Botanical Club. — E. L. RAND, Boston.

FURTHER STATIONS FOR VERONICA CHAMAEDRYS. — Through the kindness of Mr. J. F. Collins, Curator of the Herbarium of Brown University, I have just seen a specimen of *Veronica Chamaedrys*, L. from Rhode Island. It was collected on waste land in Providence by Edith M. Collins and J. H. Collins, May, 1901. This adds a fifth New England state to those recorded for this plant in RHODORA, iv. 107.

Miss M. E. Blatchford of Cambridge has kindly informed me of a station for *Veronica Chamaedrys* at Andover, Massachusetts, where it was found in grass land by Miss Alice Buck. I have also learned that the station between Cambridge and Watertown was first discovered by Miss Mary Smith of the former city. — B. L. ROBINSON.

[1] RHODORA, I, 52.

AN OSMORHIZA NEW TO EASTERN AMERICA.

M. L. Fernald.

Among some specimens collected by the late Rev. A. C. Waghorne in southern Labrador is an *Osmorhiza* which differs in some striking points from the two species ordinarily recognized in eastern America. The plant, collected in low woods on Capstan Island, Aug. 18, 1893, was distributed as *O. brevistylis*. Its umbels and umbellules, however, are quite naked, not with well developed involucres and involucels such as ordinarily occur in *O. brevistylis* and *O. longistylis*. Furthermore, the small clavate fruit is obtuse and tipped by a very inconspicuous depressed stylopodium and scarcely perceptible styles. The plant is slender and glabrous below, though minutely and sparingly hispid above and on the sharply cleft leaves.

In all its characters this Labrador plant of Mr. Waghorne's matches authentic specimens from the Rocky Mountains of the recently described *Washingtonia obtusa*, Coulter & Rose,[1] a well-marked species launched by its authors with the following apology under an unfortunate name: "The priority of the name *Washingtonia* rests upon the fact that it is mentioned before *Osmorhiza* in a list of three possible names suggested by Rafinesque for the new genus. In the same sentence he expresses a preference for *Osmorhiza*, and later formally establishes the genus under that name, by which it has been known ever since. It is under protest that we displace a name of such long use for what seems to be so trivial a reason, but the name *Washingtonia* will continue to be put forward in accordance with a technical interpretation of the law of priority."

It is certainly to be regretted that these authors felt it incumbent upon them to make a change based upon such a technical interpretation of the law of priority. As has been repeatedly shown this law followed to its technical extremes in all details would lead to such an upheaval of names as has already called out protests from former active exponents of the principle.

The name *Washingtonia*, merely mentioned by Rafinesque[2] and

[1] Contrib. U. S. Nat. Herb. vii. 64 (1900).

[2] "Several names have been proposed for it, *Washingtonia, Osmorhiza Gonatherus*; but these are not yet published; the second is perhaps the best."—Am. Mon. Mag. ii (1818), 176.

then abandoned by him for the preferred *Osmorhiza*, was for years applied to the western Sequoias, and it is now in popular usage and maintained by at least one professed follower of the law of priority for a Californian palm. The name was not used for the umbelliferous genus by any author besides its originator (and not even by him!) within fifty years of its original publication, but in the meantime the name *Osmorhiza* was taken up not only by Rafinesque but by other authors. The retention then of the name *Osmorhiza* for the genus is in accordance with the definition of the Berlin rule, which is now being recognized by conservative botanists as the most rational law by which to gain uniformity in the selection of generic names. The plant of the Rocky Mountains which has now been discovered in southern Labrador should be known then as *Osmorhiza* **obtusa** (*Washingtonia obtusa*, Coulter & Rose), and it should be watched for with some confidence in northern New England and adjacent Canada.

AN EXTENSION OF RANGE FOR THE TYPICAL LYCOPODIUM COMPLANATUM.— It was pointed out several months ago[1] that the plant which has long passed as *Lycopodium complanatum* in America is really not that species as it is understood by European botanists, and the European and American forms were forthwith described and the ranges of both, in this country, appended. The true *L. complanatum*, L. was cited as occurring as far south as Island Falls, Aroostook Co., Maine. In the writer's herbarium, however, there are five specimens collected on Pleasant Pond Mountain, Carratunk Plantation, Somerset Co., — more than 100 miles southwest of Island Falls. The Carratunk specimens show five good strobiles and as many more old ones. The peduncles range from 2.5 to 4 cm. long and the strobiles from 1.5 to 2 cm.; these are, in all cases, solitary. The undivided terminal branchlets are slightly more than 2 mm. wide but are not so long as in the specimens mentioned by Mr. Fernald (l. c.) who, by the way, recently called the writer's attention to the fact that the Pleasant Pond Mountain specimens represented an extension of range. — J. FRANKLIN COLLINS, Providence, R. I.

[1] RHODORA, 3 : 280.

Vol. 4, no. 42, containing pages 111 to 138 and plates 36 to 38, was issued 14 June, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 August, 1902 No. 44

TARAXACUM PALUSTRE IN AMERICA.

M. L. Fernald.

Mr. E. Williams Hervey sent me in May last a package of Dandelions from New Bedford, Massachusetts, containing *Taraxacum erythrospermum* and a larger-headed plant which he was unable to identify satisfactorily either with that species or *T. officinale*. The plant had the general aspect of the latter species, but the short deltoid erect outer bracts of its involucre suggested *T. erythrospermum*. From this species, recently recognized [1] as well established if not indigenous in New England, Mr. Hervey's plant differed in having quite plane or flat bracts to the involucre and greenish brown achenes, and in the slightly cleft or even merely undulate-dentate leaves. A comparison showed the plant to be unquestionably *Taraxacum palustre*, DC.[2] of Europe and northern Asia.

Taraxacum palustre is variously treated by European authors. By most, including Nyman, Reichenbach, Lange, Hornemann, and Hooker & Jackson, it is treated as a thoroughly distinct species; by others, as Bentham & Hooker, as a subspecies of *T. Dens-leonis* (*T. officinale*); while by Blytt it is considered a variety of the common species, and is called *T. officinale*, Weber, var. *palustre*, Blytt.[3]

Whether the plant is clearly distinct from *Taraxacum officinale* it has been impossible satisfactorily to determine the past season. Certain observations, however, are worth recording, that other observers may be prepared to study the tendencies of the dandelions in their own regions during the next spring.

[1] Fernald, Bot. Gaz. XX. 323.
[2] Fl. Fr. IV. 45.
[3] Norg. Fl. i. 619.

After receiving Mr. Hervey's material I watched the dandelions in Cambridge and found that while large areas of the Cambridge Common and adjacent sections were occupied by *Taraxacum erythrospermum*, with corniculate-appendaged bracts, the outer short and ascending or merely spreading, and *T. officinale*, with the bracts all flat and unappendaged, the outer linear-lanceolate and strongly recurved even in bud, damp sheltered situations, especially roadside ditches and similar spots, were quite as often given over to *T. palustre*. And in a morning walk Mr. Walter Deane and I found *T. palustre* and *T. officinale* scattered indiscriminately by the sidewalks on Brattle Street. There, however, occurred some individuals which in their involucres were not clearly either species, and which suggested that the two plants are not specifically separable.

On May 30, in company with Messrs. Luman Andrews, C. H. Bissell, and J. R. Churchill, I visited Salisbury, Connecticut; and there by damp roadsides and in shaded dooryards and ditches *T. palustre* abounded, often to the exclusion of *T. officinale*; and though exceptional specimens showed a tendency to have more spreading bracts than in the extreme of *T. palustre*, none with the short deltoid or ovate-lanceolate outer bracts had them strongly reflexed as in *T. officinale*. From this character alone, we found it a simple matter to distinguish the two plants at some distance. The involucral character, seems, however, to be the only one by which the two plants are separable; and although that is usually so marked as to give the plant a characteristic appearance, the tendencies noted in Cambridge to a mingling of characters, lead me to conclude that it is best for the present to follow Blytt in treating *Taraxacum palustre* as a variety of *T. officinale*. The first of July *Taraxacum palustre* was found in damp soil in Cutler on the extreme eastern coast of Maine by Dr. G. G. Kennedy, Mr. E. F. Williams and the writer; and a few days later on the Aroostook River in Northern Maine by Mr. Williams and the writer.

Besides the fresh material studied during the spring, I have seen two herbarium specimens, one collected on Blue Hill, Milton, Massachusetts, by Dr. G. G. Kennedy in April, 1896, the other at Rutland, Vermont, by Mr. W. W. Eggleston in June, 1899. These collections indicate that the plant is to be expected over a broad range.

The three dandelions now known to be well established in New England may be quickly distinguished as follows.

* At least the inner bracts of the involucre with the keels thickened near the tips forming corniculate appendages: heads about 75-flowered, yellow: achenes reddish: leaves deeply and finely runcinate-pinnatifid.

T. ERYTHROSPERMUM, Andrz. Usually in dry soil, common in the coastal district, less so inland.

* * All (or nearly all) the bracts flat and unappendaged: heads larger, orange yellow: achenes greenish or brown: leaves less cut.

T. OFFICINALE, Weber. Outer bracts of the involucre lanceolate or linear-lanceolate, strongly reflexed even in bud. — Common and widely distributed.

Var. PALUSTRE, Blytt. Norg. Fl. i. 619 (*Leontodon palustris*, Smith, Fl. Brit. ii. 823. *Taraxacum palustre*, DC. Fl. Fr. iv. 45). Outer bracts shorter and broader, mostly ovate-lanceolate or deltoid, ascending. — Damp soil, Maine, Vermont, Massachusetts, and Connecticut; and probably throughout.

GRAY HERBARIUM.

MISCELLANEOUS NOTES ON NEW ENGLAND FERNS, — V.

GEORGE E. DAVENPORT.

NOTE 8. — *Supplementary.*

WOODSIA OBTUSA, Torrey. This fern should be added to my list in RHODORA, vol. 4, p. 49, as number 18 under C. For this year I found sterile fronds wholly green as late as March 2nd. Miss Slosson says of it: "Fertile fronds perishing in autumn, sterile fronds lasting into winter, decaying toward spring." Ledges. Me., N. H., Vt., Mass., R. I., Ct.

Mr. Gilbert has suggested the propriety of including *Onoclea sensibilis* and *Struthiopteris* in the list on account of the perennial duration of the fertile fronds.

Correction. — Dr. Graves, of New London, Connecticut, has called my attention to an error in crediting *Asplenium montanum* to limestone cliffs in Connecticut, and I gladly make the proper correction here. I shall always be glad to have any errors of mine pointed out and thankful to anyone who will call my attention to them so that I can make such corrections as may be necessary.

NOTE 9.—SOME FURTHER OBSERVATIONS ON NEPHRODIUM. The substance of the following note was prepared for the March RHODORA in order to define more clearly my views on *Nephrodium* and its combinations, but has been withheld from publication pending the result of efforts to obtain some definite information regarding the work ("Hort. Med. Par. Cat.") cited without author for the genus *Nephrodium* by Richard in Michaux's Flora. Dr. Robinson, when consulted in regard to the matter, rightly surmised that the reference must allude to a rare publication by Marthe. Efforts to find a copy of this work in America, however, proved ineffectual and it is through the courtesy of Professor Édouard Bureau, Director of the Museum of Natural History in Paris, where the work exists, that I am now able to present the readers of RHODORA with an authentic copy of the title-page and that part of the work which relates to Nephrodium. I give the matter as it occurs in a letter from Professor Bureau to Dr. Robinson and as it concerns the earliest reference to one of the larger genera of ferns it cannot fail to interest fern students at the present time. The title page runs:

Catalogue des Plantes du Jardin Medical de Paris, disposées selon le système de Linné, avec l'explication de quelques changements faits à la système. Publié par François Marthe, cultivateur du dit Jardin. À Paris, chez Gabon, Libraire, rue et place de l'École de Médicine. An IX.

Upon the above title Professor Bureau comments as follows: Au dessous des mots: du dit Jardin est écrit à la main: *et fait par L. C. Richard de l' institut.* Nous pensons que ces deux lignes sont écrites par un employé de la bibliothèque, au moment de la donation. Sous la ligne: An IX, on a écrit *1801.* Sur la première feuille, il y a ces mots écrits: *Donné par l' auteur fructidor an 9e*; et sur le 3me feuille, on voit encore écrit: *L' auteur à la bibliothèque du Muséum national d' Histoire naturelle.* Ces deux inscriptions paraissent être de la main de Louis Claude Richard, sans que je puisse l' affirmer positivement.

Concerning the brief reference to *Nephrodium* Professor Bureau continues: À la page 120, je trouve dans le texte: — NEPHRODIUM FILIX MAS. *Néphrode Fougère mâle.* Votre supposition se trouve donc vérifiée.

This communication from Professor Bureau is invaluable as it fully establishes the identity of the "Hort. Med. Par. Cat." cited by

Richard in Michaux with Marthe's Catalogue. The latter is given in Pritzel's "Thesaurus" both editions, the earlier one (1851) containing the full title exactly as here given. In Pfeiffer's Nomenclator (i. pt. 1, p. 449) the work is cited for *Botrypus* (*Botrychium*) in the same form as by Richard in Michaux and in the octavo edition of his "Nature Printed Ferns" (1859), under *Lastraea Filix-mas*, Moore also cited it in the same way for *Nephrodium Filix-mas*, Richard, giving the page (120) and date (1801) correctly.

This effectually disposes of a recent declaration that *Filix-mas*, was first placed in *Nephrodium* by "Hooker in 1862–1874"! The record here presented shows clearly enough that it was so placed by Richard himself in 1801. Desvaux also cited *Nephrodium Filix-mas*, Richard, in 1828 (Mem. Soc. Linn. vi. p. 60, see Eaton, Ferns of N. Amer. i. p. 312), thirty-four years before Hooker's use of it!

We have now a well authenticated record showing, first, the publication of *Nephrodium* two years before its publication in Michaux; and second, the publication of a generic and specific combination, which complies with that portion of the fifth rule in the Rochester Code which declares that "the publication of the *name* of the genus and the citation of one or more previously published species as examples or types of the genus with or *without* a diagnosis" shall constitute publication of a genus.

The assumption that *Nephrodium* equals *Polystichum* because *N. acrostichoides* the first species mentioned in Michaux proved to be a *Polystichum*, is thus shown to be untenable, even on the basis of those who believe that the first species under a complex genus must be taken as the type, as we have here the earlier publication of *N. Filix-mas*, fortified by the addition of the three species from Michaux and the additional historic fact that "the early writers did not always name the most typical species first." The principal of the first species fixing the type of a complex genus is altogether modern, and one that I have no where "professed" to accept notwithstanding a recent assertion to the contrary. There is, I conceive, a great difference between "the first species under a genus" and the first *correctly named* species, the latter being the form of expression which I have used. In the other form the principle has been rejected even by Dr. Britton (Science xiii. 588; 1901). It is extremely doubtful if any of the old authors ever gave a thought to the arrangement of species with any such a purpose in view, and when there is

more than one species mentioned, the first which conforms to the requirements of the genus should be sufficient to hold it. A case in point occurs in *Athyrium*, where in seven species mentioned by Roth, only one (*A. Filix-foemina*), and that the sixth, conformed to the requirements of the genus, yet that one is universally accepted as the type for *Athyrium*, whether considered as an independent genus, a sub-genus, or a mere section.

As an example of how little the early authors thought about this matter it may be stated that Presl, in his Tentamen Pteridographiae after citing Schott for *Aspidium* named his own species (*Plumieri*) first, although Schott had figured and cited *A. trifoliatum* for Swartz's type.

Here we have one of those illogical treatments where a name is transferred from its original author to another merely because that other reduces or enlarges its application. Schott illustrated Swartz's *Aspidium* from a typical species, and although he himself cited Swartz as authority, Presl subsequently cited him as authority. Now if Presl was justified in citing Schott for *Aspidium*, subsequent authors would be justified in citing *Aspidium*, Presl, as his treatment was different from Schott's. The common sense view would therefore seem to be to anchor a generic name to its original author whether its application be reduced or enlarged as the right of an author to his own should remain intact. It is of course to be expected that generic limitations should expand or contract with the varying conditions of knowledge, and especially through augmentation by additional species with slight deviations form the original characters, but otherwise congeneric.

This has been the case with *Nephrodium* which was founded on the character of the indusium, and apparently for the express purpose of separating the kidney-shaped from the peltate form; and no subsequent treatment has destroyed the force of this one character for which *Nephrodium*, Richard, stands to-day, exactly as it did more than one hundred years ago.

In tracing the further history of the genus down to the present time we find that Swartz in 1806 (Synopsis Filicum) merged *Nephrodium* into his ASPIDIUM, where it is still retained by some of the very best authorities. In 1810 Robert Brown published in his Prodromus a list of New Holland ferns under *Nephrodium*, which he separated from *Aspidium*, but without giving Richard credit for the genus as

he ought to have done. Here for the first time we have the introduction of two species, *N. unitum*, R. Br., and *N. molle*, R. Br., with the lower series of veins in the lobes connivent, but otherwise certainly congeneric with Richard's original species. Brown, however, paid no attention to the venation, and as his treatise was devoted to the consideration of New Holland ferns only his list comprises a different set of species from Richard's.

The genus continued to expand through the addition of other species with connivent veins until 1824, when Bory attempted to separate it into two divisions, retaining the connivent-veined species under *Nephrodium*, and proposing a new genus, *Lastraea*, for the species with free veins, thus exactly reversing what would have been the proper treatment, as Richard's original species were free-veined.

Bory's proposed genus does not appear to have been well received, but his most unwarrantable division of *Nephrodium* was carried still further in 1832 by Schott, who, in his Genera Filicum, figured *N. molle*, R. Br., for the type of *Nephrodium*, an error which was repeated in 1836 by Presl in his Tentamen Pteridographiae, where, for the first time, the ferns were comprehensively treated on the basis of the character of the venation in conjunction with that of the fructification.

In that work Presl cited Schott as authority for *Nephrodium*, although the latter clearly had no intention of appropriating the name to himself as he cited Richard for it. Presl also cited Schott as authority for *N. molle*, notwithstanding the fact that Robert Brown (l. c.) had published the combination in 1810.

Not, however, until this work of Presl, had any attention been paid to the character of the venation, which did not therefore enter into previous considerations as a factor in the determination of genera. Therefore it was not surprising that Richard's genus should have become so much enlarged by the addition of connivent and netted-veined species as to make some kind of division, if only sectional, desirable. The really surprising thing about it is that when such division was deemed necessary, the free-veined species, which were characteristic of the original types should have been set aside and under another name assigned to an author who had nothing to do with the original genus.

Presl resuscitated Bory's *Lastraea*, changing the orthography to *Lastrea*, and assigning to it all of the free-veined species, which, as

we have seen, properly represented the original forms of *Nephrodium*; yet singularly enough among the species so referred we find two, *L. patens* and *L. tetragona* with connivent veins!

At the same time Presl proposed two additional genera, *Pleocnemia* for the species having some of the veins in the same as well as contiguous groups united and *Sagenia* for those with the veins copiously anastomosing, thus dividing *Nephrodium* into four genera. These were subsequently reduced to subgenera, or sections by Sir William Jackson Hooker, who, while substantially adopting Presl's arrangement, treated *Nephrodium* as one comprehensive genus based on the original character of the indusium, retaining *Lastrea* for the free-veined, and establishing his own *Eunephrodium* for the connivent-veined section.

The order of arrangement adopted by Hooker in Genera Filicum placed *Eunephrodium* in the first section with Schott as authority, for the section only, but in Species Filicum Richard is cited as authority for the whole genus. In Synopsis Filicum of Hooker and Baker, the order of arrangement was changed so as to place the free-veined section first, thus practically restoring the original form of Richard's genus, and this form has continued to the present time, so that it is not too much to say that there has been an almost uninterrupted use of *Nephrodium* since its first establishment by Richard in 1801.

Now in this early publication of *Nephrodium Filix-mas* by Richard we have just such a generic name and example; and no advocate of the Rochester code can consistently reject it. It is, moreover, fortified by the well-known vernacular name "Fougère mâle" which accompanies it, and made absolute by the addition of three more species from Michaux's Flora that are congeneric.

As *Nephrodium Filix-mas* is thus shown to be the earliest *Nephrodium* known, it not only fixes the initial date for the genus at 1801, but, as it antedates *N. acrostichoides*, it effectually disposes of the argument of those who claim that *Nephrodium* equals *Polystichum* because *N. acrostichoides*, erroneously supposed to be the earliest species, belongs to the latter genus.

The absence of *N. Filix-mas* from Michaux's Flora was perfectly natural, as it was not at that time known to be one of the North American plants with which alone Michaux's Flora was dealing.

Here then we have, first, the authentification of Richard's earlier

use of *Nephrodium* as per his citation in Michaux, second the verification of Moore's citation for *N. Filix-mas*, and third, a type that is not a *Polystichum* although Adanson described it as such ("envolucre enparasol.")

However as *Filix-mas* is the species upon which *Dryopteris* is assumed to rest let us briefly consider the relative position of that genus and *Nephrodium* with regard to it.

Dryopteris, although derived from the earlier pre-Linnaean name (*Druopteris*) of Dioscorides, dates from Adanson (1763), *Nephrodium* from Richard (1801), and this gives to the name *Dryopteris* a priority in time. But the name *Dryopteris* was not used again by any author for more than seventy years after its use by Adanson and this, according to the Berlin Rule[1] which is now accepted by many conservative botanists, relieves us of any obligation to take such a name up now. Furthermore Adanson's description does not apply to the species mentioned in connection with it, and the result is an incongruous combination, which is not entitled to serious consideration. If we put this to a test by analysis we will have some such form as this: —

DRYOPTERIS: — "*enveloppe enparasol*" i. e. indusium peltate, with uninterrupted margin, the attachment being strictly central.

Example: — *Filix-mas*, indusium *cordate-reniform*, i. e. with the margin deeply cleft on one side into a definite sinus with the attachment at its base, thus appearing one-sided instead of central.

Result, a disagreement.

Now the interpretation of "enparasol" admits of only one meaning and it has never had any other than the one which represents a lady's sunshade — a parasol, or an umbrella, and no one has ever known a parasol to have its handle otherwise than in the centre, or to have its rim divided. It is impossible to reconcile the disagreement that we have here, and I know of no better characterization for a genus with its description standing for one thing and its *type* (!) for another than the one I have previously used of being ill-defined. It is not enough to say that Adanson intended to describe *Filix-mas*, the fact that he did not do so correctly is beyond dispute. Besides, no subsequent author used *Dryopteris* until Schott, in 1834 (71 years

[1] As this rule, which is known as the fifty year limit, has been much misrepresented of late, it may be well to explain here that it has nothing whatever to do with species, but applies to genera only.

afterward) used *Dryopteris Filix-mas* as a *synonym* under *Polystichum*, thus giving rise to the later synonym of *Dryopteris Filix-mas*, Schott, and yet Schott never *adopted* the genus! Now if Adanson established *Dryopteris* on *Filix-mas*, the proper combination should be *Dryopteris Filix-mas*, Adanson, and that would serve to render the disagreement which has been pointed out still more conspicuous. But in considering the claims of *Nephrodium* we have an entirely different state of affairs. We have here a combination properly published with a reference that makes the species selected typical of the genus, and within two years a reaffirmation of the generic name accompanied by a fuller description that defined the character of the fructification as the one special generic character, and in this sense the genus has been maintained by good authorities from that time to this exactly as I have before stated in my notes.

The Swartzian genus *Aspidium* comprised two well marked divisions each characterized by the presence of a definite form of the indusium sufficiently constant to constitute an almost absolute line of separation, the exceptions being either accidental, or temporary, and not of sufficient frequency to affect the general result. Both have circular sori but in one the indusium is round with entire margin, the attachment showing exactly in the centre, thus forming the *peltate indusium*, which exactly corresponds to Adanson's description "*en-parasol*," and constituting the basis for *Aspidium* as reduced, *Polystichum* or *Tectaria*; in the other the margin of the indusium is incised with the attachment apparently one-sided, and forming the one special character, the *cordate-reniform indusium*, upon which *Nephrodium* rests.

The question of the venation is really another matter. There being only free-veined species in our New England ferns, with which alone these notes are dealing, it has not seemed to me necessary to do more than to bring out the historic fact that the early species had free veins, in order to show the true characters of the original species. No account, however, was taken of this fact by Richard, and the presence of free veins in the original species may be taken as an accidental coincidence which does not change the original indusial character on which the genus was based. The subsequent expansion of the genus by the addition of species with connivent veins was a perfectly natural one and cannot vitiate its claims to recognition. Neither can any objection, based on the "*melange*" which Richard

placed in the genus, have any weight, as it would act with equal force against nearly all of the early fern genera, especially the Linnaean *Polypodium* and *Asplenium*, which were quite as badly mixed up as Richard's *Nephrodium*.

In tracing out the historic evolution of *Nephrodium* from its publication in Marthe's Catalogue in 1801, it is interesting to note the fact that Richard's name does not appear at all in connection with the reaffirmation and enlargement of the genus in Michaux's Flora in 1803, an omission which probably led to the habit of citing Michaux as authority, at least for the original combinations. There would seem however, to be little doubt that Richard elaborated the ferns in Michaux's Flora. Pritzel's references to the matter are somewhat indefinite, and the only certain inference that can be drawn from them is the fact that Michaux and Richard were collaborators in the preparation of the Flora, and as Richard was known to have been the cryptogamic botanist, the inference that he was responsible for the treatment of the ferns is unavoidable.

Consequently if Richard was the real author of that portion of the work it is only right to credit him with such combinations as occur under *Nephrodium*. In accordance with this reasoning I have, in my notes, cited Richard as authority for combinations usually credited to Michaux.

Now in Michaux's Flora we have three species, *Nephrodium Noveboracense*, Desvaux, *marginale*, Richard, and *cristatum*, Richard, that are congeneric with *Filix-mas* and we may justly claim that the genus is thoroughly grounded on a substantial basis.

This is true whether we write Brown, Schott, Presl, Smith or Hooker as authorities for subsequent changes. One fact stands out clear and indisputable, and that is that the Swartzian group of Aspidiums consists of two distinct types in the character of their indusia, and *Nephrodium* has been used in the Richardian sense for the type with cordate-reniform indusia for more than a century exactly as I have stated.

The treatment of the genus abroad has been more or less variable according to the views of different authors, and in this country it has, until quite recently, been used in accordance with the views of Mettenius as approved by Prof. Eaton. Of late, however, there has been an increasing tendency to recognize the independence of *Nephrodium*, and this I believe will become more and more universal.

It has been in use by Shimek for a long time. Mr. Gilbert has adopted it, and Mr. Clute has signified his intention of doing so for the future. More recently Mr. House, and now Prof. Waters has adopted it in his admirable Analytical Key for the Ferns of the North-eastern States Based on the Stipes. As against *Dryopteris* its claims are twofold: — first, the derivation of its name — from νεφρος (nephros) referring to the kidney form of indusium — exactly indicates its generic character; second, it rests upon at least four clearly defined species that accurately represent the generic characters.

Finally we may sum up the various points of this article as follows: — (1) *Nephrodium* as a genus has been in existence for more than one hundred years (2). With the exception of the brief period of four years intervening between Swartz's reference of it to *Aspidium* in 1806, and its restoration by Robert Brown in 1810, it has been recognized in one form or another from the time of its original publication to the present. (3) Having been established on a special character the subsequent addition of other characters could not destroy the force of the original.

What I wish most to emphasize here is this: —*Nephrodium* rests primarily on the character of its indusium. The nature of its venation had nothing to do with its original definition. In subsequent revisions, based on new sets of characters in which the venation had become prominent, the character of the original species should have been considered as typical of the genus. The fact that this was not always done, however, does not deprive us of the right to maintain the genus in its present form.

MEDFORD, MASSACHUSETTS.

SOME ADDITIONS TO THE FLORA OF MASSACHUSETTS. — On the 29th of May of this year Mr. Ezra Brainerd and I found a large colony of bushes of *Crataegus scabrida*, Sargent, near the banks of a small stream some two miles west of Williamstown. This appears to have been the first time that this common Vermont species has been noticed in Massachusetts. On the same day we found *Crataegus asperifolia*, Sargent, along the road between Williamstown and North Adams. This is also a new plant for Massachusetts. The following day we saw near the summit of a high rock close to the main street

of Great Barrington two small trees of *Quercus acuminata*, Sargent. The nearest stations to Great Barrington known to me for this tree are Newberg, New York, where many years ago I saw a single specimen about two miles north of the city, and Gardener's Island in Lake Champlain, the only place in New England, with the exception of the one at Great Barrington, from which this tree has been reported. Mr. Brainerd tells me that the trees on Gardener's Island have recently been destroyed. On May 31st in driving from Great Barrington to West Stockbridge we saw in a low wet meadow large trees of *Crataegus lobulata*, Sargent, *Crataegus Pringlei*, Sargent, and by the roadside a bush of *Crataegus asperifolia*, Sargent.— C. S. SARGENT, Arnold Arboretum.

TWO NOTEWORTHY CARICES AT SUDBURY MASSACHUSETTS.— On June 17th, 1902, the writer accompanied by Messrs. M. L. Fernald and W. P. Rich took an early train for South Sudbury, Massachusetts. We went in quest of a rare sedge, *Carex teretiuscula*, Gooden. var. *ramosa*, Boott, which Mr. Fernald and Miss Helen M. Noyes had discovered in June, 1901. It was found as we expected in a beautiful little open peat bog in company with Pogonias, Arethusas and Saxifrages and just in time to be collected. It had previously been known in New England only from Vermont (see Brainerd, Jones and Eggleston's Catalogue) and from the town of Mt. Washington, Berkshire County, Massachusetts (July 5, 1859, Wm. Boott in Herb. Gray). Mr. Fernald also collected it this year on May 30th at Salisbury in northwestern Connecticut. Thus its station at South Sudbury is the first east of the Housatonic river, although the plant has since (July 13th) been found in a swamp at Presque Isle, Maine, by Mr. Fernald and the writer.

While we were busily pulling up a sufficiency of the Sudbury material for distribution among our friends and correspondents Mr. Fernald joyously exclaimed that he had discovered a new *Carex*. We have often had this experience when botanizing with this accomplished caricologist and therefore were not particularly startled, but when we learned that it was *Carex tetanica*, Schkuhr, var. *Woodii*, Bailey, we shared in his pleasure for we were informed that it had been collected in New England only once before and then by himself in a larch swamp on May 30th, 1902, at Salisbury, Connecticut. It

To Mr. M. L. Fernald I am indebted for the following data. "The only occurrence of *Peltandra* in Maine, besides Miss Furbish's Brunswick station, seems to be a record of the plant at South Berwick. (Proc. Port. Soc. Nat. Hist. i. 129)."

At East Parsonsfield in July, 1900, I found in some abundance upon a certain hillside, *Conopholis americana* (L.) growing among second growth Beech and Hemlock. Of this plant Mr. Fernald has given these facts. "*Conopholis* has been collected at Fryeburg by the late Edwin Faxon, and at South Poland by Miss Furbish." — Arthur H. Norton, Westbrook, Maine.

Aulacomnium heterostichum in Maine.— In April, 1902, while collecting in open, deciduous woods at Vassalboro, Maine, I found a large tuft of *Aulacomnium heterostichum*, Br. & Sch., growing upon a steep, moist bank. The plant was abundantly fruited with old capsules of the previous year and with very immature ones of the present season. In his List of the Mosses of Vermont, Dr. Grout gives three stations for this moss in southern Vermont, but the plant has not been heretofore reported from either Maine or New Hampshire. It is not uncommon in southern New England. Duplicates of this collection are in the herbarium of Mr. J. F. Collins, and of the New England Botanical Club.— Edward B. Chamberlain, Cumberland Centre, Maine.

Aquilegia canadensis, var. flaviflora in Maine.— I have just noticed the name *Aquilegia canadensis flaviflora* (Tenney) Britton in Britton's Manual. For many years I have had a pale yellow form growing in my garden and on our campus. The originals came from near Topsham, Maine. I suppose this form to be the same as Professor Britton's. Mine has always been true to the parent in seedlings, though it is growing near the typical form.— Leslie A. Lee, Bowdoin College, Brunswick, Maine.

[*A. canadensis*, var. *Phippenii*, J. Robinson, a form with salmon-colored flowers, described from near Salem, Massachusetts, has been found sparingly with the ordinary form of the species by Mr. M. L. Fernald at Orono, Maine. — Ed.]

JUNCUS TORREYI AND ELLISIA NYCTELEA IN MASSACHUSETTS. — On the 25 August, 1901, along a railway ditch at Chelsea I came across a colony of a strange looking *Juncus* which proved to be *J. Torreyi*, Coville. It is described in Gray's Manual under *J. nodosus*, L., var. *megacephalus*, Torr.

On 1 June, 1902, while walking along the recently opened Revere Beach Parkway at Everett, I noticed in the newly seeded grassy borders numerous plants of a species I had never before seen hereabouts. The plant, described a few days after to Dr. Robinson, was at once recognized by him as *Ellisia Nyctelea*, L., which he said was a pernicious weed in some of the western states. It was evidently introduced here in impure grass seed and is not likely to maintain itself in this locality at least. So far as I can learn these two species have not before been reported from New England. — WM. P. RICH.

Vol. 4, no. 43, containing pages 139 to 154 was issued 18 July, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 September, 1902 No. 45

THE PRINGLE AND FROST HERBARIA AT THE UNIVERSITY OF VERMONT.

L. R. Jones.

The past year has been one of unusual prosperity for the botanical department of the University of Vermont, opening with the acquisition by special bequests of some $500 worth of valuable books and closing with the transfer to its halls of the library and herbarium of C. C. Frost, and the transfer and endowment of the Pringle herbarium, the fitting up of a suite of rooms for its reception, and the appointment of Mr. C. G. Pringle as its keeper. Since both the Frost and the Pringle herbaria are unique in character and of more than local significance, some account of their condition and the disposition to be made of them may be of interest.

Charles C. Frost, "the shoemaker botanist" of Brattleboro, Vermont, was well known to the cryptogamic botanists of the middle of the last century, in Europe as well as America. Most of his botanical work was done between the years 1845 and 1875. He was, during this time, in correspondence with the leading cryptogamists of this country and evidently exchanged specimens quite extensively. He gave special attention to various groups of the lower plants, at different times, but his best work was upon the fleshy fungi, in which he was closely associated with Mr. Charles. J. Sprague, Professor C. H. Peck, and others. His most important publication is the cryptogamic portion of the Amherst Catalogue issued in 1875. Since his death, in 1880, his library and herbarium have remained in the possession of his family, who deposited them about 1890 in the public library building in the keeping of the Brattleboro Natural History

Society. An excellent account of the herbarium at that date together with a biographical sketch of Mr. Frost by Professor W. R. Dudley is in the Journal of Mycology II, 114 (1886). Owing to lack of room this Society never was able fully to arrange the collections other than the lichens, which were worked over by Mr. Starrow Higginson in 1891. The Society at last decided, through the especial interest of two of its members, Mrs. Elizabeth B. Davenport and Judge H. H. Wheeler, to recommend the transfer of the entire Frost Herbarium to the University of Vermont. This has been accomplished and the arrangement and cataloguing of the specimens so as to render them accessible to botanists is now under way.

The library includes about one hundred volumes together with a considerable amount of manuscript notes, drawings and correspondence.

Mr. Frost was evidently not a herbarium maker by nature and his collections are not so extensive as his long and active botanical career would lead one to expect. The herbarium includes between 3000 and 5000 specimens of cryptogams so far as can be judged at present, the phanerogamic portion being of minor interest and value.

These specimens are usually not very generous in size and naturally have deteriorated much during the quarter of a century since Mr. Frost ceased to care for them. However, much of historical interest and value attaches to them. This is especially true of the Boleti of which there are a considerable number of type specimens. We hope to be able soon to have the specimens in all the groups so arranged and catalogued as to be easily accessible and will then welcome visits or inquiries from specialists who are interested in them.

No word of introduction is needed regarding Mr. Cyrus G. Pringle or his botanical work. Suffice it to say that, while he is widely known because of his contributions to the herbaria of others, it has been his chief ambition and an important part of his occupation for some thirty years to prepare a herbarium of his own of the best quality and most comprehensive nature possible. It was this desire which first led him into the field explorations in Vermont and later into those more and more extensive collecting expeditions to western America and Mexico which have so greatly enriched most of the large herbaria of the world during the last quarter of a century. His own herbarium has heretofore been kept at his farm home in Charlotte and to its quiet alcoves he has each year returned from his

arduous western and southern journeys there to spend weeks or months, as other duties or season permitted, in its development, care and study. It gradually outgrew his rooms and he decided last winter to accept the invitation, first extended to him some years ago, to transfer it to the University of Vermont and to make that institution his headquarters. This has been done and rooms adequate for the largest probable developments of the next generation are being fitted for its permanent reception. The building in which these rooms are located is a modern brick structure, steam heated, and strictly fire proof. The rooms in preparation will include a main herbarium room about 40 × 45 feet, a store room and a private office and study each about 20 × 20 feet. The herbarium room is lighted from above as well as on the sides and is admirably suited for its purposes. Cases are now being installed capable of holding about 100,000 sheets and there is room for at least as many more without a suggestion of crowding.

The Pringle herbarium now includes about 50,000 sheets, giving the University a total collection to-day approximating 70,000. No statement in figures, however, can give an adequate idea of the relative value of the Pringle herbarium. His aim heretofore has been to make it widely representative of the known species of the world and hence much duplication has been avoided. As a result these 50,000 sheets represent pretty completely. for the vascular plants, the known flora of North America, a large majority of the European species and a good showing from the other parts of the world. Specimens have been added by collection and exchange with much painstaking and discrimination — all except the choicest and most representative being rejected. Those who have seen it and who are competent to pass judgment pronounce it the finest large herbarium in existence. Its further development will remain entirely under Mr. Pringle's direction so that its symmetry and perfection will not be marred.

The friends and alumni of the University upon learning of the prospect of Mr. Pringle's coming to Burlington contributed $10,000 to constitute a permanent endowment fund for the herbarium and associated research work. The University is indebted to the generosity of Dr. W. Seward Webb for $6000 of this amount.

Botanists generally will be concerned to know the effect of Mr. Pringle's associations with the University of Vermont upon his future field work. No demands will be made upon his time or energies by

the University which will interfere in the least with this. He is left, if anything, more freedom than heretofore to pursue his explorations in Mexico or elsewhere. If in years to come he wishes to turn from that work there is provision that he may further develop herbarium or other botanical work at home, but it is distinctly provided that the work at the University is not to interfere with his freedom in his work as a botanical explorer. He is at present in Mexico and will remain there until some time in the autumn. Upon his return the herbarium will be finally installed in its new quarters.

UNIVERSITY OF VERMONT.

AN ALGOLOGIST'S VACATION IN EASTERN MAINE.

F. S. COLLINS.

THE annual meeting of the Josselyn Botanical Society of Maine, in July, 1902, gave me an excellent excuse for visiting some parts of the coast that were outside the range of my previous explorations; the results of the visits were very satisfactory, and as far as they include new algae or critical matters in regard to already known species, will probably be published a little later; the present article is intended to give a more general account of the algological character of the places visited.

The first point at which collecting was done was Cutler, very near the eastern boundary of the United States. The attractiveness of this place, and the curiously boreal character of the land flora are known to the readers of RHODORA from the interesting account by Dr. Kennedy of his visit in 1901.[1]

The place is everyway as attractive as represented, and the northern character of the marine flora is marked. Arctic and subarctic marine floras are characterized by many individuals, often of large size, but of comparatively few species. The flora of the Cutler shore was of this character, but owing to the considerable variety of stations — exposed coast, quiet harbor, and salt marsh — the number

[1] RHODORA, Vol. IV, p. 23.

of species represented is relatively large. Specially noticeable here was the *Laminaria* formation, near and below low water mark. *Laminaria stenophylla* occurred here in a considerable colony just at low water mark, on a smooth, steeply sloping rock, exposed to the full force of the waves. At the time I discovered this colony the sea was exceptionally quiet, and I secured as much as I could take away in my bag. When I returned for more, the next day at low tide, the waves were washing up on the place where I must stand. Any good botanist would cheerfully take a drenching for the sake of a good specimen, but in this case not merely a drenching but a carrying out to sea was fairly likely, and the needed specimens had to be given up.

Chorda tomentosa was abundant in the harbor, growing in pretty deep water, and stretching along the surface at low tide, as *C. Filum* does in most places. The plant is not uncommon all along the New England coast, but a plant two feet long is a large specimen, usually; the original description by Areschoug says "Planta usque metrum longa": but here, growing in dense tufts, the plants often become 15 feet long, and with dense hairs standing out appear as stout as one's finger.

Another plant occurring here in individuals of unusual size was *Ilea fulvescens*. It is a common species in its special habitat, but usually in fronds so small as to be noticeable only in the mass. Here it had the habit of *Enteromorpha intestinalis*, and fronds over a yard long and half an inch in diameter were found. It seems to occur only where it can have alternately fresh and salt water; the Cutler locality is exceptionally favorable, at the mouth of a considerable brook. At low tide the stream runs briskly over the stones on which it grows; at high tide they are under several feet of salt water. *Ilea fulvescens* is nearly related to *Enteromorpha*, in which it has sometimes been included; it is chiefly distinguished by the very gelatinous cell wall, the cells arranged in distinct groups of fours. These characters seem to be connected with its peculiar habitat, and occur in other plants exposed to fresh water, *Monostroma quaternarium*, for instance, otherwise hardly distinguishable from the marine *M. latissimum*. These characters of gelatinous membrane and cells in groups of fours appear in a still greater degree in the genus *Tetraspora*, common in fresh water everywhere, but not found in the sea.

Plumaria elegans grew here in luxuriant specimens, on shaded perpendicular or overhanging rocks, sometimes five or six feet above low water mark. I have never found specimens of such large size on the Massachusetts coast, where the plant grows in similar stations, but large specimens are abundantly washed ashore at Newport, Rhode Island, though the plant is never found attached above low tide level. And during more than twenty years collecting, I have never seen a specimen washed ashore, north of Cape Cod.

Machias, where the Josselyn Society meeting was held, is not a station for marine algae, but excursions were made to two points on the shore, Roque Bluffs and Point of Main, including a visit from the latter to Starboard Island. In crossing the bar which at low water makes a peninsula of the island, I saw plants of *Laminaria platymeris* growing on rocks and large pebbles, in some cases with stipes so short that the lamina seemed sessile. As noted by Setchell [1] this plant, on the Massachusetts coast, is usually epiphytic on larger Laminarias, but along the eastern half of the Maine coast it usually grows on stones. What is commonly known as *Delesseria alata* was found in some abundance at Starboard Island, washed up from below low water mark; the plants quite luxuriant. On the American coast this species seems specially a northern plant, growing smaller as we go south, seldom occurring south of Nahant. In Europe what passes for the same species is most luxuriant in the English Channel, in company with species here found only south of Cape Cod, and others not found north of North Carolina. It may be that the European and the American plants are distinct.

Rhodophyllis dichotoma has been reported from New England only from Cape Ann and Marblehead. As it occurs at Greenland and Labrador, it might be expected anywhere on the Maine coast, but it was interesting to have its presence there established by specimens in the collection of Miss Lucy Longfellow of Machias, secured at some of the islands near by. When at Portland, the week following the meeting, I found specimens in the collection of the Portland Natural History Society, gathered in Portland harbor, by the late C. B. Fuller, then curator of the society.

The relations between things apparently distinct are sometimes important. If the steamboat wharf at Machiasport had not been

[1] RHODORA, Vol. II, p. 143.

or only very slightly known; and I am convinced that many more are only waiting for me to call again and make their acquaintance.

MALDEN, MASSACHUSETTS.

THE DISTINCTIVE FEATURES OF IRIS HOOKERI.

J. FRANKLIN COLLINS.

(Plate 39.)

IN the February RHODORA[1] Dr. G. G. Kennedy records the finding of *Iris Hookeri*, Penny; at Cutler, Maine. On the second of July, 1902, Dr. Kennedy, Messrs. E. F. Williams, M. L. Fernald and the writer found an abundance of the plant at the station mentioned. Upon comparison with *I. versicolor*, which grew in close proximity, several important differences were noticed, which as emphasizing the distinctness of the species seem worthy of record.

I. Hookeri has narrower leaves with more prominent nerves, it is more strict and less glaucous than *I. versicolor*, and it grows in situations where the drainage is apparently better — e. g. along the edges of gravelly beaches and at the crests of the ocean cliffs where the plants are often subjected to baths of salt spray. The spathes are usually greener and appear to be inwardly falcate; really however, they are conduplicate, strongly pointed, and incurved throughout the upper part. At the base the plant is more or less purplish and often there are purple flecks scattered along the lower portions of the leaves.

In the flower and fruit, however, the most distinctive characteristics are found. In *I. Hookeri* the inner segments of the perianth (or petals) are totally different from the corresponding parts of *I. versicolor*. This contrast is well brought out in the accompanying plate, in which figures 4, 5, 6, and 7 represent petals of *I. Hookeri* and figure 8 a petal of *I. versicolor*, — all natural size. The petals in the former are not only very small and comparatively inconspicuous, but have their edges involute below or even rolled up so as to form a hollow tube-

[1] RHODORA, iv. 23 (1902).

like structure. These vary more or less but are seldom larger than represented in the plate, which shows three of the different forms noticed. The two petal-like lobes at the apex of each style-branch are in *I. Hookeri* usually spreading rather than slightly overlapping as was noticed to be the case in specimens of *I. versicolor* observed at Cutler.

The fruit of *I. Hookeri*, which matures fully two weeks earlier than that of *I. versicolor*, is broader, shorter, and thinner-walled. It is always beakless and is sometimes rather bluntly triangular while at others, especially when young, it is inclined to be sharply angled.

The plants grow in great abundance on the farm of Mr. W. R. Corbett of Cutler, who told us that since Dr. Kennedy called his attention to the two species last year he had been watching them and now had no difficulty in telling them apart, even in the dark, by simply feeling of the pods. It is not easy to imagine a more beautiful sight than that formed by thousands of these plants growing as they do along the summits of the cliffs, often making blue areas which can be seen for a long distance.

BROWN UNIVERSITY, Providence, Rhode Island.

EXPLANATION OF PLATE 39.— *Iris Hookeri*: fig. 1, flowering branch; fig. 2, leafy branch; fig. 3, bud; figs. 4, 5, 6, petals; fig. 7, side view of petal; fig. 9, young fruit; fig. 10, cross-section of the same; fig. 11, older fruit; fig. 12, cross-section of the same. *Iris versicolor*: fig. 8, petal.

NOTES ON VERMONT MOSSES.

A. J. GROUT.

SINCE the publication of the supplement to my Vermont Mosses I have spent two summers in the state and have collected copiously each season.

I have found several species not before reported from the state and have also been able to verify several of Frost's doubtful reports so that it seems probable that his list is entirely reliable.

The collections from Newfane have been of special interest to me as they are mostly from places familiar to me from childhood and over which I had passed times without number.

Species New to the State.

Fissidens incurvus Schwaegr. On stones in brook, Newfane.

Ditrichum vaginans (Sulliv.) Hampe. Newfane.

Orthotrichum sordidum S. & L. Butternut tree in dooryard, Newfane.

Bryum affine (Bruch.) Lindb. Mt. Holly, Eggleston.

B. pseudotriquetrum (Hedw.) Schwaegr. Willboughby, Faxon.

Thuidium microphyllum (Sw.) Best. Decayed log in moist woods, Newfane.

Amblystegium subtile (Hedw.) B. & S. Bark at base of maple tree, Stratton.

Hylocomium brevirostre (Ehrh.) B. & S. North exposure of Baker Brook Ravine. On rocks and soil, Newfane.

Hylocomium squarrosum (L.) B. & S. Cold swamps, altitude of 1500–2000 ft., Stratton, Stowe, Johnson.

Hypnum fertile Sendt. Rotten log, north exposure of Baker Brook Ravine.

From the descriptions I had supposed this species to be near *H. reptile*, but it is much more likely to be mistaken for *H. crista-castrensis* from which it differs in its more slender habit. Sterile it would readily be confused with *H. imponens* but it is lighter in color and has strongly curved capsules.

Hypnum fluitans var. *Atlanticum* Renauld in the Journal of Botany for August, 1901. This new variety was described from Britain and the continent so that this is the first and only collection from America. The specimens were collected in swampy places under the spruces near the Summit House, Mt. Mansfield. The original description and notes were reprinted in full in the March, 1902, Bryologist. The specimens were determined by M. Renauld.

Hypnum pallescens (Hedw.) B. & S. Bases of fir stumps and trees in mountain woods. Mt. Mansfield, Stratton. Closely allied to *H. reptile* and sometimes found growing in the same locality. But *H. pallescens* is a mountain species with shorter capsules, leaves less closely appressed and strongly secund at the tips of the branches.

Hypnum Patientiae Lindb. Nearly if not quite all of the Vermont mosses previously referred to *H. pratense* should be referred here. This species is not rare but is likely to be confused with *H. curvifo-*

lium because both have their capsules strongly costate when dry.

Hypnum uncinatum forma *plumosa* Sch. Det. Renauld. Stones in and near small rivulet, Baker Brook Ravine, Newfane.

Fontinalis Cardoti Ren. Det. Cardot. This is Mr. Pringle's specimen labeled *F. Lescurii*, Enosburg, June 18, 1880.

Dichelyma capillacea (L.) B. & S. Stems of *Cephalanthus* in swamp, Newfane. This was reported by Frost but no specimens could be found.

New Localities for Rare or Interesting Species.

[1] *Fissidens minutulus.* Damp rocks, Newfane.

Dicranum montanum. On rotten log, Newfane.

Schistostega osmundacea. Occurring in great abundance under the sill of an old shed on the underpining of stones and earth; Newfane. The protonema of our American *Schistostega* ends in flask-like cells, which I have not seen illustrated in any European work.

Leptobryum pyriforme. Not rare in damp shaded places. Basement wall north side of the old St. Joseph's College Building, Burlington.

Mnium orthorrhynchum. Moist ravine, Newfane.

Thelia asprella. On old apple-tree stump, Newfane. A careful search of the vicinity failed to discover another lot of this species.

Thuidium paludosum. Soil in Higbee Swamp, Burlington.

Amblystegium Lescurii. Stones in brook with *Fissidens incurvus*, Newfane.

Amblystegium irriguum. Stones in brook, Newfane.

Hylocomium Pyrenaicum. Newfane.

Hypnum cordifolium. Frequent in swampy mountain woods.

H. molluscum. On humus, Glebe Mt., Newfane.

H. ochraceum. Stones in brook, Stratton.

Plagiothecium Muellerianum. Crevices of ledges in ravine, Newfane.

Leskea nervosa. Base of trees in open woods, Newfane.

Plagiothecium turfaceum. Frequent in Newfane.

Brachythecium glaciale from Willoughby, Faxon, proves to be *B. reflexum.*

[1] Authorities as in my list of Vermont Mosses.

Eurhynchium strigosum so far collected in Vermont is var. *robustum* Roell.

Bryhnia graminicolor. Willoughby, Dr. Kennedy. Newfane.

Porotrichum Alleghaniense. Wet overhanging rocks, Newfane.

Rhynchostegium serrulatum. On soil, Higbee swamp, Burlington. Newfane.

Entodon repens. Newfane.

Pylaisia velutina. On trees, Stowe.

Homalia Jamesii. Not infrequent on cool shaded rocks in moist situations.

Leucodon sciuroides. Not uncommon.

Boys' High School, Brooklyn, New York.

SEED DISPERSAL OF VIOLA ROTUNDIFOLIA.

R. G. Leavitt.

At maturity the capsule of the violet slowly opens. Each of the three boat-shaped valves holds several smooth, hard, oval seeds. As the fruit dries and the sides of the valves draw together more and more strongly, the seeds are squeezed with increasing force. At length they escape from the pressure and are at the same instant thrown to a distance. The end seeds in each valve fly out first, according to Kerner, and the rest follow in orderly succession at intervals. The distance attained by the seed-missiles of this catapult fruit is given by the authority mentioned as a little over three feet in the case of *Viola canina*, for which alone figures are given. We have at present in the garden of native plants at North Easton a violet, *V. rotundifolia*, which puts Kerner's species to shame in this matter of seed dispersal. Young plants from the spring crop of self-sown seeds have now grown to such a size that they may be definitely recognized by the round leaf; and they form a living chart of the points to which the seeds were thrown. The parents occupy a pocket or small bed marked off by a circle of stones. In an adjoining pocket, within one or two feet of the home plantation, the offspring have come up freely. At a distance of a little more than 5 feet there are three seedlings. And there is one young plant 9 feet,

1 inch from the nearest adult of the species. It happens that all the seedlings are up hill from the original bed, so that water could not have furnished transportation. The arrangement of separating the pockets by lines of stones and the peculiar position of the farthest seedlings with reference to stones, exclude the garden rake as the dispersing agent. And finally, there are, within several miles of the spot, no members of the species except those in the pocket mentioned, so that the question of source is definitely settled. It seems clear, then, that *Viola rotundifolia* has the power of casting its seeds to a distance certainly of five, and very probably of nine, feet.

The process of expulsion may be watched if the ripe, unopened fruits are separated into their parts and laid on a table where they will dry. Results will follow within a relatively short time, within a few minutes if the capsules are already well prepared. In *V. rotundifolia* the middle of the three rows of seeds in each valve goes first. Some of the seeds are merely pushed out. Many are thrown less than a foot. Those that are caught in the right way between the jaws of the machine, or have the strongest attachments to the placenta fly the farthest. The intensity of the reaction is dependent largely upon the tenacity of the seed-stalk, which parts and releases the projectile only after the lateral, or oblique, pressure has become considerable.

The round-leaved violet is one of the earliest to bloom. After anthesis prostrate peduncles are put forth until past midsummer, bearing cleistogamus flowers. The capsules lie on the ground, hidden away under the leaves and often more or less buried beneath surface accumulations. When the performances of the earlier fruits had been noted, the question was naturally suggested whether these late pods have the same powers of projection, or whether owing to lack of use, this power, like the sight of cave fishes, has been lost. The answer was given at once, for all stages of the seed vessel from imperfect ripeness to barren age were found together. That answer is this. As the fruit approaches maturity the peduncle bends about midway. The capsule is withdrawn from its seclusion and elevated to a position about two inches above the earth, from which level the valvular catapults may work with advantage. The seeds are then expelled as in other cases.

THE AMES BOTANICAL LABORATORY, North Easton, Massachusetts.

ANAGALLIS ARVENSIS AND CAERULEA IN VERMONT.

Alice E. Bacon.

In the summer of 1898 the writer of this note was told of a "pink chick weed" to be found on a terrace near her home. On investigating the matter she found a few scattered plants of *Anagallis arvensis* in that locality, and a few days later a single plant was found in a bed of pansies north of her house and two more in the lawn. Specimens were placed in her herbarium with date — July 28, 1898, and full notes.

Noticing a few weeks ago that the plant was not credited to Vermont in Mr. E. F. Williams' list in Rhodora for January she sent part of the herbarium specimen to Prof. L. R. Jones of Burlington, for identification, with the promise of fresh flowers if possible.

A few days later a lusty plant was found in a row of sweet peas, in ground that has been closely cultivated for years. Search was immediately made in the places where it had been found before and the plant was found in abundance on the terrace and nowhere else. It had increased in four years from a few plants to many hundreds, spreading the whole length of a high terrace, checked on the north only by the highway and on the south by cultivated land.

Specimens were sent to the Herbarium at Burlington and also to Mr. Williams. Growing with the *A. arvensis* were several plants bearing blue blossoms, which Prof. Jones identifies as *A. caerulea*; the plants are few as compared with the *A. arvensis* but both are evidently increasing rapidly and are thoroughly established. Although in the heart of the village the rather inconspicuous blossom and its habit of closing early and in cloudy weather has probably preserved it from destruction.

Still more recently *A. arvensis* has been reported from several places in this vicinity. Attention of flower-lovers was called to the plant, and several specimens were found in a strawberry patch on a farm about a mile distant from the first recorded station and brought for identification. Single plants were also gathered a mile or two from the village in different directions; they were smaller, less vigorous and fewer-flowered. The plant evidently has been spreading in

this section and probably will soon be reported from other places in the Connecticut Valley, Vermont side. Specimens of *A. arvensis* will gladly be forwarded to any Vermont reader of RHODORA upon application to the writer of this note. *A. caerulea* has not been reported except from the terrace of which mention has been made.

BRADFORD, VERMONT.

ASTER UNDULATUS × NOVI-BELGII.

M. L. FERNALD.

IN October, 1900, Miss E. L. Shaw called my attention to an *Aster* found by her in a sandy thicket at Carlisle, Massachusetts, which presented a perplexing combination of the characters of *A. undulatus* and *A. Novi-Belgii*. Early in October, 1901, Miss Shaw showed me the spot where the *Aster* occurs, but, unfortunately, in the widening of the road much of the thicket had been temporarily destroyed and the tops at least of the *Aster* removed. However, roots of a plant which had been transplanted to Miss Shaw's garden furnished material which, in connection with that collected in 1900, shows very well the characteristics of the plant. In the neighborhood of the original station in Carlisle *A. undulatus* is abundant on the dry banks, while typical *A. Novi-Belgii* with strongly squarrose involucre covers extensive areas of meadow. The intermediate plant of the sandy roadside thicket has the pubescence of *A. undulatus*; and the leaves though less clasping, scarcely constricted at the base, and narrower than in *A. undulatus*, have the texture of that species, while they are shorter, broader and more toothed than in *A. Novi-Belgii*. In its branching the plant simulates *A. undulatus* more than *A. Novi-Belgii*. The involucre, however, is more often composed of strongly squarrose herbaceous bracts as in the most extreme form of *A. Novi-Belgii*. In some heads, nevertheless, the bracts are firm and appressed-ascending as in *A. undulatus*. All attempts to place this plant with either of the species to which it is closely related have led to the conclusion that it is equally close to the other. The limited area of the plant, its proximity to the abundant *A. undulatus* and *A. Novi-Belgii* and its decided mingling of the characteristics of these two very dissimilar species indicate that the plant is of hybrid origin. Its chief characters are:

Aster undulatus × Novi-Belgii. Stem tall, 7 to 9 dm. high, closely cinerious-puberulent especially above, bearing toward the summit many loosely ascending very leafy branches: leaves oblong or elliptic-oblong, dull and more or less puberulent on both faces; those of the main stem 3 to 6 cm. long, 1 to 2 cm. broad, acuminate at the tip, narrowed to a slightly clasping base; coarsely appressed-serrate near the middle: those of the branches numerous, much reduced, 0.7 to 1.5 cm. long, oblong to ovate, obtuse or acutish, subentire: heads few or solitary at the tips of the branches; the involucre 6 or 7 mm. high, the bracts in 2 or 3 series, either linear-lanceolate and firmly appressed-ascending, or with the outer recurved, or linear-attenuate, herbaceous, and mostly recurved-spreading: rays blue-purple. — Damp sandy thicket, Carlisle, Massachusetts, October, 1900 (*Miss E. L. Shaw*).

GRAY HERBARIUM.

A FORM OF THE BITTER BOLETUS.—The form of the Bitter Boletus (*B. felleus* Bull.) that grows on hemlock stumps is sufficiently familiar. In its small cap, comparatively slender, and markedly reticulated stem this form of the hemlock stumps departs from the usually generous and frequently huge dimensions of the species as it grows in rich woods. That the larger form may sometimes appear on stumps was shown at Alstead, New Hampshire, early in July and doubtless others have observed it. A specimen was found with a very stout stem that was swollen at the base and half covered with coarse reticulations, the walls of which have an imperfect hymenium. This answered to Peck's variety *obesus*, which is usually terrestrial. Its appearance during a very wet season in place of the smaller form suggests that the stout-footed form is not a variety in the strictly systematic sense — an observation applicable to numerous similar so-called varieties of fleshy fungi. In this specimen the angular and in some places compound pores were larger than in those of a neighboring small but mature specimen. In spite of a heavy rain the night before no viscidity, such as Professor Peck speaks of, was noted. Both stem and pore surface on being bruised assumed permanently a brown tint — the brown of dead leaves — which was strongest on the flesh colored spore surface. The flesh showed a slight tendency to turn pinkish — not always noticeable in dry weather, and the tubes became strongly flesh-color when the air and moisture were squeezed out of them.

Perhaps the only justification for offering a note on such a well-known species as *Boletus felleus* is the hope that it may emphasize the need of close observation of the variability of common and easily recognized species of fleshy fungi as a basis for the intelligent study of less common forms, the descriptions of which as recorded and fixed in type are often much too rigid and exclusive.— H. WEBSTER, Alstead Centre, New Hampshire.

VIRULENCE OF THE WILD PARSNIP.—The following note on poisoning from contact with the juice of the Parsnip (*Pastinaca sativa*) may prove of interest. The writer was walking with a botany class along a Berkshire roadside, and attracted the attention of a farmer, who after some conversation on the various herbs growing near by, asked whether I knew that the Parsnip, which lined the roadside, was poisonous to handle. I replied in the negative, and shortly after when the farmer had left us, expressed my disbelief in the poisonous qualities attributed to the plant. To prove its innocence I broke off a stalk, let the juice collect and rubbed it hard across my wrist. During the rest of the walk nothing developed, and I thought that I had proved my case. Over night, however, a blister developed on the spot, preceded, I believe, by irritation, though of this latter point, I am not certain. The blister became large and did not subside for several days. After an interval of six years, a dark line on the wrist still serves to attest the truth of the farmer's observation.—RALPH HOFFMANN, Alstead Centre, New Hampshire.

ANNUAL MEETING OF THE JOSSELYN SOCIETY.— The Annual Meeting and Field Day of the Josselyn Botanical Society of Maine was held at Machias, July 8–11 inclusive, and proved a most successful and profitable season.

The days were spent in the field, the evenings with receptions, business meetings, and lectures. Merritt Lyndon Fernald talked on The Flowering Plants of the Maine Coast, describing the coast-line, the direction of the prevailing winds, and the effect upon the flora of the coast, explaining the geographic origin of our flora, and illustrating with characteristic plants of the extreme portions of the coast of Maine. Frank Shipley Collins spoke on The Sea Weeds of New

England, beginning with the structure of the algae, classification, etc., illustrating with specimens, and closing with instructions to amateurs as to the collection and preservation of the sea weeds.

Excursions were made from Machias to the lakes and bogs in the vicinity, and to the towns of Marshfield, East Machias, Whitneyville, Roque Bluffs, and Machiasport, including Buck's Harbor and Point of Main. On the Point of Main was found *Sedum Rhodiola*, a station not before recorded. *Mertensia maritima* grew in great abundance and beauty on the Point of Main, also at Roque Bluffs. At this latter station, *Arenaria peploides* (a very local plant in Maine) was found. Here also grows *Rubus Chamaemorus* and *Kalmia glauca*. *Senecio Robbinsii*, *Potentilla palustris*, *Centaurea nigra*, *Scheuchzeria palustris*, *Matricaria inodora*, and *Matricaria discoidea* were also recorded, and a double form of the wild rose, *Rosa lucida*.

The ground was covered in patches with the beautiful *Euphrasia Americana*, again with *Vaccinum Vitis-Idaea*, while other spots were carpeted with *Empetrum nigrum*, and the road-sides were fairly brilliant with *Leontodon autumnalis* and its variety *pratensis*. *Alnus viridis* was the common alder in this region, *Picea alba* and *Abies balsamea* were noticed in full fruit at five or six feet, and *Larix Americana* was everywhere seen.— Dora H. Moulton, Sec'y, 9 Hill St., Portland.

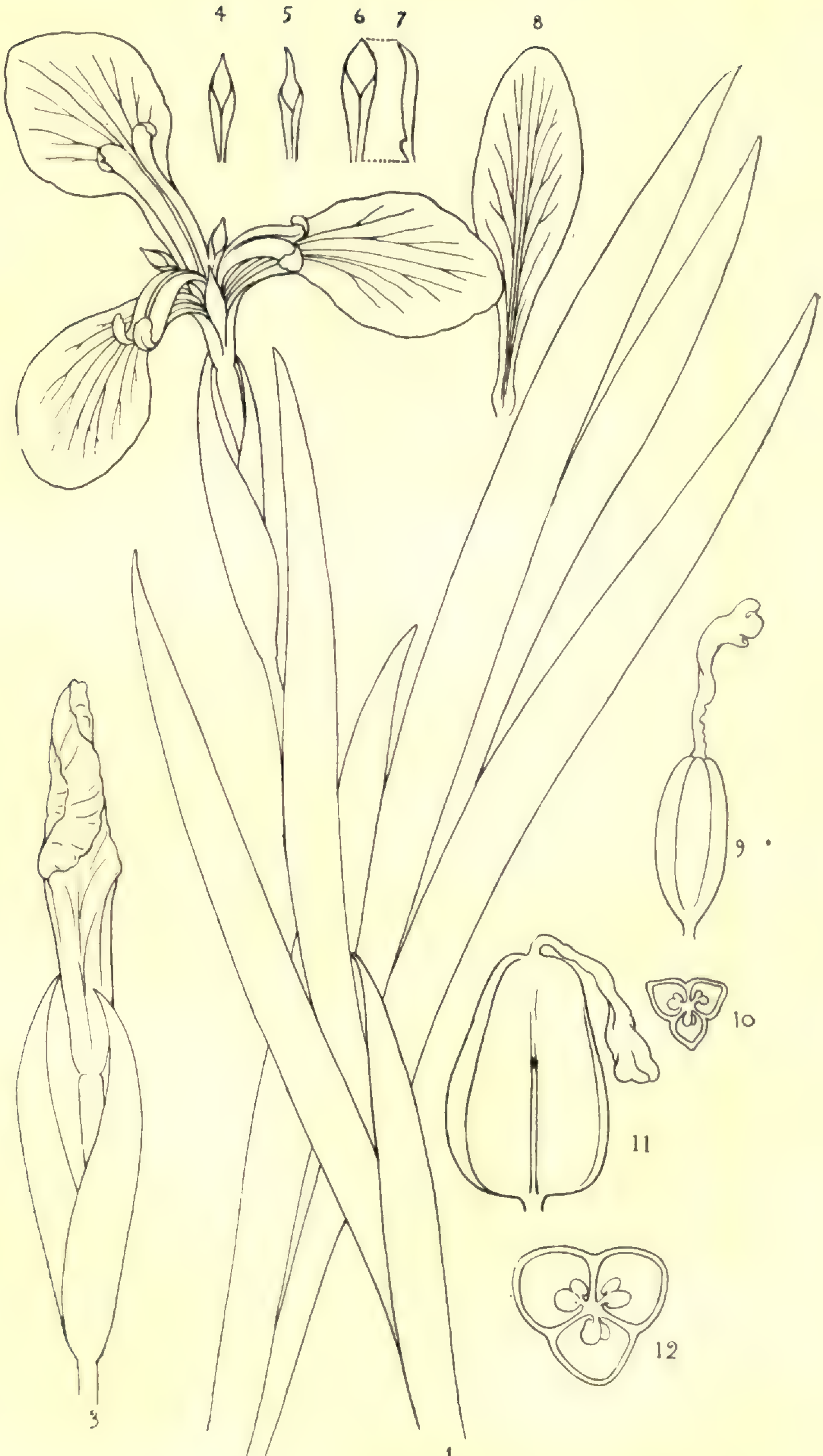
Field Meeting of the Vermont Botanical Club.— The eighth annual field meeting of the Vermont Botanical Club occurred July 3 and 4. Most of the preceding meetings have been in the mountain regions of the interior of the state, so Lake Champlain was chosen for exploration this year. Burlington was the headquarters and the small excursion steamer, Mariquita, was chartered for the two days that the less accessible islands and shores might be visited at will. The Vermont Bird Club joined in the outing and about forty members of these organizations participated. It was the unanimous verdict that it was the most pleasurable and profitable field meeting to date and the hope was generally expressed that at least one of the two days next summer might be given to a similar cruise to other places about the lake.

On July 3 the weather was threatening in the morning so the shorter cruise was made to the rocky wooded shores of Grand Isle and the sand flats at the mouth of the Au Sable river. The sight of

greatest interest was *Leucophysalis grandiflora* in full bloom at the first mentioned place where it occurs in an abandoned quarry. It is a beautiful plant worthy of general cultivation as an ornamental species were it easily propagated. A comparison of experiences led to the conclusion that this may present some difficulties but it is to be undertaken by some of our members. It evidently behaves in nature as some of the orchids, appearing in great profusion in certain seasons and nearly disappearing in others.

On July 4 the weather was ideal and the full day and early evening were spent in a longer cruise from Burlington southward with landings at Thompson's Point, Gardiner's Island, Fort Cassin, and a cruise up the Otter Creek to Vergennes. The greatest interest of this day centered upon Gardiner's Island — made locally famous years ago by Mr. C. G. Pringle's explorations. It is one of the most interesting botanical areas in the State, consisting of an island of but few acres off the mouth of the Little Otter Creek. It is the home of fine specimens of *Quercus Muhlenbergii*, thickets of *Staphylea trifolia* and *Viburnum pubescens*, together with *Physostegia Virginiana* and other plants unusual in Vermont. Fortunately the island is uninhabited except perchance by an occasional fisherman and the natural flora has remained almost undisturbed by man. It was suggested that an organization be formed in connection with our club to secure by purchase or gift this and similar areas of peculiar botanical interest that their preservation in the natural state may be insured to succeeding generations of botanists. In many cases at least the expense would be slight in proportion to the gain to botanical science. — L. R. JONES, University of Vermont.

Vol. 4, no. 44, containing pages 150 to 170, was issued 9 August, 1902.



Iris Hookeri, figs. 1–7 and 9–12. I. versicolor, fig. 8.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 October, 1902 No. 46

TWO NORTHEASTERN VERONICAS.

M. L. Fernald.

Veronica Beccabunga.

The common Brooklime, *Veronica Beccabunga*, of Europe was well known to the older English herbalists as Broklempe or Broklympe and finally as Brooklime, a name which has been the subject of much conjecture among students of English plant-names; and by the German herbalists it was referred to as Bachbunge or Beccabunga. The plant according to Gerard, early in the 17th century, was eaten in salads in the same manner as watercresses, and like them occurred "altogether of his own nature wilde, desiring to grow in waterie places, and such as be continually overflowne, ... by rivers sides, small running brookes, and waterie ditches."[1] The Brooklime seems now to be in less repute as a salad, for Syme states that "the leaves and young stems of the Brooklime were once in favour as an anti-scorbutic, and even now the young shoots are sometimes eaten as watercresses, the two plants being generally found growing together. They are perfectly wholesome, and might be more frequently employed but for prejudice."[2] And though the plant is not now of much account in medicine it was, as stated by Syme, highly valued in the 16th and 17th centuries as a remedy for scurvy, and "the leaves boyled, strained, and stamped in a stone morter with the pouder of Fenugreek, Lineseeds, and roots of marish Mallowes, and some hogs grease, unto the forme of a cataplasme or pultesse, taketh away any swelling in leg or arme; wounds also that are ready

[1] Gerard, Herball, ed. Johnson, 621 (1633).
[2] Syme, Engl. Bot. vi. 170 (1876).

to fall into apostumation it mightily defendeth, that no humor or accident shall happen thereunto."[1]

In the earlier floras of eastern America, such as those of Pursh and Bigelow, we find a plant described as *Veronica Beccabunga*, and under this name the American Brooklime was known until, in 1846, Bentham took up[2] a manuscript name of Schweinitz's and established the American plant as *Veronica americana*, Schweinitz,[3] a species which differs from the European *V. Beccabunga* in its more ascending habit, more pointed leaves, and longer more slender pedicels.

Since the distinctions between the European plant and its commoner American representative were pointed out the name, *Veronica Beccabunga*, has dropped from our literature. It was, therefore, peculiarly interesting to Mr. Emile F. Williams and the writer to find, in August last, the true European Brooklime, *V. Beccabunga*, thoroughly at home about Quebec. During a two-days' visit in that quaint historic region we drove for some miles both south and north to the scenes most accessible to the transient visitor. While following in Wolfe's Cove the famous ascent to the Plains of Abraham we were attracted by a *Veronica* growing perfectly prostrate and repent in the roadside ditch. The plant, with its prostrate and freely branching stems and blunt-oblong or rounded glossy leaves, looked, at first glance, so like a mass of stolons of *Mentha piperita* that it was only upon closer inspection that we realized that we had the Brooklime of European floras. The same plant was later seen in abundance in the brook which empties over a high fall from Spencer Wood into Wolfe's Cove, and it was noted in roadside brooks and ditches as far southward as we drove, through the village of Sillery. The next day, in driving to Montmorenci, we saw the Brooklime

[1] Gerard, l. c.

[2] Benth. in DC. Prodr. x 468 (1846).

[3] In the Synoptical Flora Dr. Gray includes *V. intermedia*, Schweinitz, Am. Jour. Sci. viii. 268 (1824) as a synonym of *V. americana*. The name *V. intermedia*, was published by Schweinitz, in a list of the rarer plants of Easton, Pennsylvania, for a plant "commonly called beccabunga." Were it quite clear that Schweinitz referred to the plant subsequently called by him *V. americana*, the earlier name, *V. intermedia*, would have to be taken for that plant. But according to Bentham (*l. c.*) the name, *V. Beccabunga*, was often used by early American authors for *V. Anagallis*, and since this species is well known to occur at Easton it is very probable that by *V. intermedia*, Schweinitz referred to *V. Anagallis* and not to *V. americana*.

equally abundant in the village of Beauport, fully eight miles, as the crow flies, from Sillery; and there as elsewhere it grew in "small running brookes, and waterie ditches."

Though *Veronica Beccabunga* is now thoroughly at home about the city of Quebec it was apparently not seen by either Michaux or Pursh [1] in their wide travels through Canada, and it has not apparently been noted by later botanists. In the limited and thickly populated district where it is now known to occur it is associated with many other plants obviously introduced from Europe, and there is no reason to suppose that the European Brooklime is indigenous in Canada. In view of its wide repute in Europe as a remedy for scurvy and other pestilent diseases and its use as a salad during the 17th century, it would be interesting to know whether *Veronica Beccabunga* was intentionally brought to America by the early French settlers of Quebec. If this were the case, however, it is strange that the plant escaped the eyes of both Michaux and Pursh.

Veronica serpyllifolia.

In June, 1898, while botanizing along the Aroostook River at Masardis, Maine, I was impressed by the remarkable development of *Veronica serpyllifolia* in the alluvial soil of the river-terraces. Not only was the plant much larger than any form of *V. serpyllifolia* with which I had been familiar but its flowers, often a quarter inch broad, were deep blue with violet stripes, not the pale or whitish color we know in the small-flowered plant of Massachusetts grasslands and roadsides. At Masardis and, as it proved later, at many other points in the Aroostook and St. John valleys this showy blue-flowered *Veronica* abounded on river-terraces or in rich open woods, often brilliantly coloring the ground for many rods. Like *V. serpyllifolia* this plant of northern Maine had many strongly decumbent branches, but these were frequently quite a foot in height, while the leaves were sometimes a full inch in length. Material of this plant was collected at various points in the valleys and a special watch was kept for the ordinary *V. serpyllifolia* of southern New England. This, however, was not seen, and when, upon returning to Cambridge, the large plant was compared with it, a point of distinction formerly

[1] The *V. Beccabunga* of Pursh, from Pennsylvania to Virginia, was probably *V. americana*.

overlooked was detected in the material. While the ordinary whitish-flowered plant of southern New England had the rachis of the slender raceme and the pedicels minutely puberulent with fine gray hairs, these parts in the blue-flowered plant of the north bore longer viscid hairs.

A comparison with European specimens has shown this blue-flowered glandular plant to be well known to Old World botanists who treat it sometimes as a distinct species, sometimes as a variety of *Veronica serpyllifolia*. The plant was first described in 1794 by Dickson as *Veronica humifusa*,[1] though it had formerly been included by Lightfoot in his Flora Scotica as *V. alpina*,[2] but later treated by him merely as a form of *V. serpyllifolia*.[3] To Dickson, in 1794, it was known in the Scotch Highlands only "upon very high mountains, and under wet shady rocks, where the *V. serpyllifolia* never occurs." In 1838, Sir William Hooker, whose discriminating eye detected many plants long since overlooked in America, noted the plant as *V. serpyllifolia*, var. *humifusa*[4] from the Rocky Mountains. In 1839, Laestadius described the same plant from Lapland as *V. serpyllifolia*, var. *borealis*,[5] and under this name it was recorded from the Venetian Alps and illustrated by Reichenbach.[6] By Hooker & Arnott the plant is called *V. serpyllifolia*, var. *alpina*,[7] while by Babington,[8] Syme,[9] and some others it has been taken up as a subspecies under the original name of Dickson.

Since this glandular-hairy blue-flowered plant was originally noted in Maine much herbarium material has been examined and the plant has been watched in the field; and as a result of this study it seems that, while strongly marked in its extreme form, the plant too often approaches the typical *Veronica serpyllifolia* to warrant its separation as a distinct species. As a boreal variety, however, the blue-flowered form is certainly well marked in America, and it should be called *V. serpyllifolia*, var. *humifusa*, Hooker. In fact, the evidence now at hand indicates that this large-flowered variety is the only indigenous form of *V. serpyllifolia* in Northeastern America. The true *V. serpyl-*

[1] Dickson, Trans. Linn. Soc. ii. 288 (1794).
[2] Lightfoot, Fl. Scot. 72.
[3] Lightfoot, l. c. 1138.
[4] Hook. Fl. Bor.-Am. ii. 101 (1838).
[5] Laest. Nov. Act. Soc. Ups. xi. 211 (1839).
[6] Ic. Fl. Germ. xx. 44, t. 1718, fig. iv.
[7] Hook. & Arn. Brit. Fl. ed. 8, 305 (1860).
[8] Man. Brit. Bot. ed. 5, 249 (1862).
[9] Engl. Bot. vi. 158, t. 979.

lifolia with small pale flowers and puberulent, not glandular-hairy, racemes occurs commonly from Newfoundland to Ontario and Michigan and south to the Gulf of Mexico, but so far as I have observed in New England and Eastern Canada it is always in the neighborhood of towns, and oftenest in lawns, roadsides and cultivated or old fields. Occasionally it occurs in woodlands but there it is usually by roads or paths where its occurrence suggests possible introduction.

The larger-flowered glandular var. *humifusa*, on the other hand, is perfectly at home in mountain woods and by streams, and in natural meadows far from settlements, and a study of the accumulated material shows it to be the common form in such situations over a broad range. As now known, the plant is found from Labrador and Newfoundland to the White Mountains, and southeastern New York; and from Colorado, Utah and southern California north to Alaska.

Gray Herbarium.

VALERIANELLA IN NEW ENGLAND.

C. B. Graves, M. D.

In the spring of 1901, through the kindness of Miss Mary F. Crofton, I received a few specimens of a *Valerianella* collected by Miss Edith M. Shelley of Waterford, Connecticut. The immaturity of the material did not admit of a positive determination of the species, and I did not get an opportunity that season to investigate it further. Last June, following Miss Shelley's directions, I visited the locality from which the plants came. The abundant material collected then proves the plant to be *Valerianella radiata* Dufr.

The station is in the town of Waterford on the east bank of Niantic river, which is here salt. The species is abundant on the slope of the gravelly terrace, reaching from just above high-water mark nearly to the top of the bench, and extending along the shore for about a quarter of a mile.

The bank at this point is covered by a low shrubby tangle made up chiefly of poison ivy, grape vines and climbing bitter-sweet, and in the midst of this and especially along its lower edges the *Valerianella* grows freely. Among the other plants associated with it *Triosteum perfoliatum* L. and *Galium Aparine* L. are noticeable.

It has every appearance of being indigenous here. Upon this point Miss Shelley writes me: "My father has known of its growing there for all of twenty-five years."

I may add that the identification has been confirmed by Dr. Greenman of the Gray Herbarium, who has also kindly supplied me with the following facts regarding the occurrence of the genus elsewhere in New England.

As shown in the Gray Herbarium the genus *Valerianella* is represented in New England by specimens collected by Mr. C. L. Shear at Stockbridge, Massachusetts, June, 1891, and also by specimens secured near Springfield, Massachusetts in July, 1892, and communicated to the Gray Herbarium by Mrs. Maria L. Owen. These two plants, however, differ from typical *Valerianella radiata* Dufr. in having the fruit quite glabrous instead of pubescent, and hence well represent the form *V. radiata* Dufr., var. *leiocarpa* Krok.

The species has been reported from Chenango County, New York, by Coville,[1] and is said to have been collected by Prof. Peck at New Baltimore, Kings County, New York; but no record appears to have been hitherto made regarding the occurrence of either the species or the variety in New England.

New London, Connecticut.

The Occurrence of Empetrum in Franklin County, Maine. — As a note to Mr. Fernald's article on *Empetrum*,[2] I would add the following, based on field observations made in Franklin County, Maine, the past summer:

Empetrum nigrum, L., there grows best in peat-moss, and the prostrate habit is not particularly prominent, as most of the branchlets are sub-erect.

E. nigrum, var. *andinum*, DC., prefers as a soil the gravel formed by the decomposition of coarse granite, usually containing very little vegetable matter. It is spreading in habit, and forms large prostrate mats. On July 16, in company with Mr. E. B. Chamberlain, I discovered a new station for this plant, on Bald Mt., Perkins, two or three miles north of the lesser Saddleback, where I found the plant in 1899. This variety grows here in the greatest luxuriance, espe-

[1] Bull. Torr. Bot. Cl. XII, 53.

[2] Rhodora, iv. 147.

cially on the northern slopes, and it descends on the mountain at least as low as 1500 ft. Bald Mt. has a probable elevation of 2000 feet.

Owing to the cold wet spring the flowers seem to have blighted and I gathered no satisfactory fruit of either species or variety. There seems to be a general paucity of fruit this year among the mountain plants in Franklin County.— C. H. KNOWLTON, Chelmsford, Massachusetts.

HIERACIUM PRAEALTUM AT ANDOVER, MASSACHUSETTS.— In the early summer of 1901, in a dry pasture in Andover, Massachusetts, I noticed a *Hieracium* which seemed unfamiliar to me. This year, from the same locality, I obtained specimens which, when compared with others in the herbarium of Mr. Walter Deane, proved to be *H. praealtum*, Vill. The station has increased greatly in size since 1901, but prompt action may perhaps avail to stamp out this pest, I shall be interested to know whether this plant has been previously found in Massachusetts.— ARTHUR STANLEY PEASE, Andover, Mass.

CREPIS VIRENS IN EASTERN MASSACHUSETTS. — *Crepis virens*, L. (determined by Dr. J. M. Greenman of the Gray Herbarium) grows sparingly in the grass border of the boulevard near "Soldiers' Field," Brighton. Dr. Greenman tells me that this species has lately been reported from Franklin, Massachusetts, by Miss Rhoda L. Mann. — JOSEPH R. WEBSTER, North Cambridge, Massachusetts.

A NEW STATION FOR POLYPODIUM VULGARE, VAR. CAMBRICUM.— While climbing the wooded slope of the unburned peak of Western Mountain, Mount Desert Island, Maine, on August 12th last, I was greatly surprised to come upon a peculiar polypody with deeply scalloped pinnae. The plant was locally so abundant that after picking some fronds I threw them aside for others with more deeply lobed pinnae. Unfortunately I had carried no collecting box, so that many of the fronds were lost before I returned to Seal Harbor. Two of those which were saved were sent to the Gray Herbarium where an examination has shown them to be the rare *Polypodium vulgare*, var.

cambricum, Willd. This plant, originally described from England, has been recorded by Mr. B. D. Gilbert in his Working List of North American Pteridophytes from only Connecticut and New York, and I am informed by Mr. M. L. Fernald that it has not before been reported to him from Maine.— Elsie L. Shaw, Lexington, Massachusetts.

Some Notable Plant Stations in Rhode Island. — As long ago as 1879, our indefatigable co-mate, Mr. Arnold Green of Providence, reported finding *Leptopoda brachypoda*, Torr. & Gray, about Butterfly Factory in Lincoln, Rhode Island. Our first specimens are of that date, and ever since we have been able to collect the species at that place. It must have been reported to the authorities at Cambridge, one would think, yet there is no record in the last edition of the Manual concerning its occurrence in Rhode Island.

During these years it has slowly but steadily increased, but in a recent visit I have been surprised to find it actually "booming."

The plant, now known as *Helenium nudiflorum*, Nutt., has spread largely in the original locality, whence it extends sporadically northward along the Lime Rock Road. About a mile and a half up this road there is a triangular lot, something less than a quarter of an acre, covered with it to the exclusion of all else. It makes a very showy appearance with its winged stems, orange rays, and chocolate cone-shaped disks. There is enough of it to provide the herbaria of the world, and it has evidently come to stay.

The original locality, one of those chosen spots described in my "New England Wild Flowers," is a very interesting one, extremely romantic in its natural features of hill, ravine, rocky cliffs, and summit lake; it was stocked by the original owner with extra-regional plants. Many of these still prevail, like *Trillium grandiflorum*, *Robinia hispida*, etc. The place is somewhat carefully conserved and signs warn the visitor not to root up plants, break trees, or pluck flowers. This rule is not made cast-iron, however, against those who will present credentials or even decently ask for privileges. A receptacle is provided for disjecta of mince-pies and the like. According to legend this spot was a favorite resort of King Philip and his tribe of Indians. It is a little piece of New Hampshire set down in southern New England. The rocks in the neighborhood

for over a mile are clothed with *Sedum acre*. At our last visit, *Polygonum Virginianum* was in bloom and abundant. — W. Whitman Bailey, Brown University, Providence, Rhode Island.

Jasione montana in Massachusetts.— This summer I found a single plant of *Jasione montana* growing wild at Wareham, Massachusetts. It was on a sandy slope in a field about two hundred feet from a railroad track and near an inlet of Onset Bay. The nearest habitation was an old farmhouse about a fourth of a mile away, and there were no other houses in the vicinity. I first saw the plant August fourth, when it was blooming freely and it was still blooming September sixteenth when I left Wareham.

Jasione montana has been abundant for several years on Conanicut Island, Rhode Island, and it once appeared as a transient weed in a nursery at Reading, Massachusetts.[1] Although it is not established at Wareham, the appearance of the plant there may be worthy a definite record.— Anna M. Scorgie, Radcliffe College.

A New Mushroom for the Market.— For some years several species of mushrooms, gathered from the fields, have found a ready sale in the Boston market. Among these, in addition to the common *Agaricus campestris*, are *Coprinus atramentarius*, *C. comatus*, and *Tricholoma personatum*. My attention has recently been called to the selling of *Lepiota naucina*. This toadstool is sometimes abundant in rich grass land, and within a few years has appeared in unusual size and numbers in the grass plots along the new parkway around Soldiers' Field, on the Boston side of Charles River near Cambridge, Massachusetts. Here, in company with *Lepiota Americana*, and the white form of *L. cepaestipes*, it has called forth the wondering inquiries of passersby, for the number and size of the fungi has been truly astonishing. This year the locality is regularly visited in the early morning hours by assiduous collectors, so that the display of mushrooms, so conspicuous a year or two ago, is in a measure prevented. One of these collectors has found that *Lepiota naucina*, in the button stage, is salable at fifty cents a pound. He is quoted as saying that he has known ten pounds to appear over night.— H. Webster, Cambridge, Massachusetts.

[1] J. F. Collins, Bull. Torr. Cl. xxiii. 212.

Calluna vulgaris in Southern New Hampshire.— Through the kindness of Mr. Clarence H. Knowlton of Chelmsford, Massachusetts, I am enabled to add *Calluna vulgaris* from New Hampshire to my list of New England *Ericaceae.* A cross should be entered for this State, as Mr. Knowlton has sent me specimens of the plant. These were accompanied by the following note under date of September 21, 1902: — "While on a botanical excursion in Pelham, N. H., Sept. 13, 1902, my attention was called by chance acquaintances to a small clump of heather. It grew in moist grassland beside the so-called 'mammoth road,' the old-time stage-route from Boston to Concord, N. H., less than half a mile from the Massachusetts line. It grew across the road from a house, but not in a place where it would be set as a garden plant. The present occupants of the place have no knowledge of the time of introduction, and it has probably been in existence for several years. The new electric line from Lowell to Pelham passes the bush, which seems to have suffered from hard usage during the construction of the railroad. This is, I believe, the first record of the plant in New Hampshire."

I have now seen *Calluna vulgaris* from Maine (Cape Elizabeth), New Hampshire (Pelham), Massachusetts (Andover, Halifax, Nantucket, Tewksbury and West Townsend), and Rhode Island (Great Island). If it grows in Vermont or Connecticut, the vigilant botanists of these States will not leave it long undiscovered.— Walter Deane, Cambridge, Massachusetts.

Destruction of our Native Flora, A Plea for Information.— Now that public interest in the protection and preservation of our native plants is being aroused, it is most desirable that full and accurate information should be obtained in regard to the causes threatening the extermination of our more beautiful and rarer wild flowers in different parts of our country. Some of these causes will be found inevitable, some preventable; all of them need study. Information especially should be obtained in regard to the depredations, often tortious, on our plants for commercial purposes. With facts before us some effective action may be taken, while ultrasentimental arguments accomplish nothing. Realizing this need of collecting evidence relating to the needless destruction of our flora, the Society for the Protection of Native Plants has recently appointed a

Committee to receive such evidence and to report on any cases which may be thus brought before it. All persons who are able to send details and information concerning cases of depredation upon our plants, are earnestly requested to communicate with the Chairman of this Committee, Nathaniel T. Kidder, 610 Sears Building, Boston, Mass.

A New Popular Field Book.[1]— The past summer has given those who wander afield in search of flowers an opportunity to test the helpfulness of a little pocket field-book by Mr. F. Schuyler Mathews. Written from the point of view of a lover of nature, and of an artist who keenly appreciates the beauty and individuality of every plant he treats, it offers itself as a charmingly companionable guide to a first acquaintance with our wild plants. To a first acquaintance, we say, for, although a botanist of experience will find here and there a suggestion that may be new and a lesson or two in the accurate naming of colors, he will be less inclined to use the book himself than to wish it well and to recommend it to friends less well informed. Yet it is perhaps well to remember that thorough botanists are few in comparison with the increasing host of intelligent observers who are looking for accurate information, not too difficult of acquirement, in regard to our wild flowers. To this large class of summer enthusiasts, amateur collectors, and even to the serious student who is beginning to make a herbarium, Mr. Mathews's book will be very welcome.

In size, the book is made to conform to the requirement that it "must fit the narrow limits of our pocket at all hazards." In saying this the author is perhaps forgetting that most of the users of his book may be so unfortunate as not to have a pocket for any book at all. But it will certainly go into a Boston bag or other substitute for the masculine receptacle. The make-up of the book is well suited to the field use for which it is intended. Every right hand page bears a clear-cut drawing in black and white of a species, often of two or three, described in the opposite text. In the margins of the text, the

[1] Field Book of American Wild Flowers — being a Description of their Character and Habits, a Concise Definition of their Colors, and Incidental References to the Insects which Assist in their Fertilization. By F. Schuyler Mathews, G. P. Putnam's Sons, 1902.

common names, the colors, and the flowering season, stand out in heavy-faced type, with the Latin names in italics. The descriptions are brief, and, so far as is consistent with accuracy, are freed from technicalities. With the descriptions are incorporated a variety of notes, among which those on the relations of the plants to insects present a novel and suggestive feature. This matter is emphasized in the introduction, and by two introductory plates that show the commoner butterflies, bees, and flies concerned in the cross-pollination of flowers. A commonly neglected line of observation is thus constantly kept before the student.

The illustrations of species are the most striking and useful feature of the book. Of these there are over four hundred — a few being colored. The pen and ink studies, as the author calls them, show a charming grace and facility of drawing; but more than this they most happily present the characteristic look of the living plant. The very droop of the leaves, the turn of the stem, the familiar pose of the plant, are admirably caught and preserved. After studying them one can only regret that every plant mentioned in the text can not have had the same accurate, sympathetic interpretation. But in a field book, or pocket manual, space is limited. We find, therefore, that many plants are omitted altogether. The common, the conspicuous species, that may be met from Maine to Virginia are there — that is to say, the common flowers. Trees, shrubs, except a few, and also grasses and sedges are missing — and obviously there is no room for them. By its title, the book excludes them.

A captious reviewer, with dogmatic convictions on matters of botanical controversy, or a stickler for scientific form and precision might be inclined to be severe with certain things about this book — for it is a popular book. For such a critic, however, the book is not intended. Others will find in it the help they seek, and something more.

A New Local Flora.— Messrs. Charles Humphrey Bissell and Luman Andrews have just issued a Flora of the Town of Southington, Connecticut and its Vicinity.[1] The work, which is an excellently printed octavo pamphlet of more than a hundred pages, is

[1] Connecticut School Document No. 15, published by the State Board of Education, 1902.

an annotated list of the fern and seed plants, which grow without cultivation in the area covered. Under each species and variety the scientific name is followed by a careful statement of the peculiar habitat, abundance, time of flowering, and finally the citation of one or more numbered herbarium specimens. Common names, notes as to habit, and a judicious synonymy are added in many cases. Statistical summaries, including a comparative table showing the numerical relation of the flora of Southington to that of Vermont, appear at the end, together with a map and good index. Although the territory covered contains but thirty-six square miles, no less than twelve hundred and one plants are enumerated. The authors show themselves familiar with the latest taxonomic work in America and treat with excellent discrimination the recently proposed species which happen to come within their limits. The authors' "invariable rule has been to admit no name that has not an extant specimen back of it." The work throughout shows exceptional care in arrangement, typography, and proof-reading. It is safe to say that no more critically prepared flora of so limited an area has appeared in America. While the authors have scrupulously avoided making new combinations, they have introduced the following herbarium names, to which it may be well to direct attention: *Aster macrophyllus*, var. *ianthinus*, Fernald (*A. ianthinus*, Burgess), and *Cirsium altissimum*, var. *discolor*, Fernald (*Carduus discolor*, Nutt.).

PRELIMINARY LISTS OF NEW ENGLAND PLANTS, — IX. POLYGONACEAE.[1]

Wm. P. Rich.

[The sign + indicates that a herbarium specimen has been seen; the sign — that a printed record has been found.]

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Fagopyrum esculentum, Moench.	+	+	+	+	+	+
" tataricum, Gaertn.	+	+	+	+		
Oxyria digyna, Hill.		+				

[1] Printed in RHODORA as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Polygonella articulata, Meisn.	+	+		+	+	+
Polygonum acre, HBK		+	+	+	+	+
" " var. leptostachyum, Meisn.	+		+	+	+	+
" amphibium, L.	+	—	+	+	+	+
" " var. Hartwrightii, Bissell.	+	—	—	+	—	+
" arifolium, L.	+	+	+	+	+	+
" aviculare, L.	+	+	+	+	+	+
" " var. littorale, Koch.	—	+	+	+	+	+
" Careyi, Olney.	+	+	+	+	+	+
" cilinode, Michx.	+	+	+	+	—	+
" Convolvulus, L.	+	+	+	+	+	+
" cuspidatum, Sieb. & Zucc.	+	+		+		+
" Douglasii, Greene.	+	+	+			
" dumetorum, L.				+		
" erectum, L.	+	—	—	+	+	+
" exsertum, Small.	—				+	+
" Fowleri, Robinson.	+					
" Hydropiper, L.	+	+	+	+	+	+
" hydropiperoides, Michx.	+	+	+	+	+	+
" " var. strigosum, Small.		+		+		
" lapathifolium, L.	+	+	+	+	+	+
" " var. incanum, Koch.	+	+		+		
" maritimum, L.				+	+	—
" Muhlenbergii, Watson.	+	+	+	+	+	+
" orientale, L.	—	+	+	+	+	+
" pennsylvanicum, L.	+	+	+	+	+	+
" Persicaria, L.	+	+	+	+	+	+
" prolificum, Robinson.	+	+		+	+	+
" ramosissimum, Michx.				+		
" " " forma atlanticum, Robinson.	+			+	+	+
" sagittatum, L.	+	+	+	+	+	+
" scandens, L.	+	+	+	+	+	+
" tenue, Michx.	+			+	+	+
" virginianum, L.		+	+	+	+	+
" viviparum, L.	+	+	+			
Rumex Acetosa, L.	+		+	+		+
" Acetosella, L.	+	+	+	+	+	+
" altissimus, Wood.	+	—		+	+	
" Britannica, L.	+	+	+	+	+	+
" crispus, L.	+	+	+	+	+	+
" hastatulus Baldw.				+		
" obtusifolius, L.	+	+	+	+	+	+
" Patientia, L.	+		+	+		+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Rumex persicarioides, L. (*R. maritimus*, L. of Gray's Manual).	+			+	+	—
" salicifolius, Wein.	+	+		+	—	
" verticillatus, L.			+	+	—	+

Notes on the Preceding List.

Rumex sanguineus, L. and *R. conglomeratus*, Murray have been occasionally reported from New England but no authenticated specimens have been seen.

The *Rumex verticillatus* of Rand & Redfield's Flora of Mt. Desert rests on a very immature specimen, which is certainly not the species named.

Rumex hastatulus, Baldw. This is the first record of this plant in New England. A little colony of it has existed for a number of years at Salisbury Beach, Mass., having been discovered by Alvah A. Eaton of Seabrook, N. H. The most eastern locality from which it has hitherto been reported is Northville, Long Island, New York.

Polygonum aviculare, L. Numerous forms of this very variable species, have been described but with our present knowledge of the plant it is thought best to refer them all to the species with the exception of the var. *littorale*, Koch. which is generally readily recognizable.

Possibly after more detailed study and observation some others of the described varieties may be found worthy of restoration.

Polygonum arenarium, W. & K. and *P. Bellardi*, All., two European species, have been collected at Providence, R. I., and at Boston, Mass., but are not yet sufficiently established to be included in our list. They should, however, be looked for around our Atlantic seaports.

Polygonum orientale, L. while undoubtedly a garden escape is so widely distributed as to warrant its recognition to a place in our flora and *P. cuspidatum*, Sieb. & Zucc., also a cultivated plant is every year becoming more common but as yet only in the immediate vicinity of gardens.

It is of interest to note the extension of the range of *Polygonum Douglasii*, Greene, heretofore known in New England only in Vermont. In the Herbarium of the New England Botanical Club are

specimens from Brownfield, Maine, collected August 22, 1896, by E. D. Merrill, and the writer has recently received the species from Alvah A. Eaton who collected it September 15, 1899, on Pautuckaway Mt., Nottingham, New Hampshire.

The two species of Buckwheat, *Fagopyrum esculentum*, Moench and *F. tataricum*, Gaertn. are such frequent escapes from cultivation and also from transportation by railways as to have become generally common, with the exception of the latter species which has not yet been reported from Rhode Island and Connecticut, although common in the northern part of our range.

While this list is far from complete it has been thought best to publish it at this time with the hope that attention being called to its incompleteness the desired information as to the occurrence of the various species can be more readily obtained.

Vol. 4, no. 45, containing pages 171 to 190 and plate 39, was issued 17 September, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 November, 1902 No. 47

NOTES ON NEW ENGLAND HEPATICAE.

ALEXANDER W. EVANS.

THE species noted below are for the most part recent additions to the hepatic flora of New England, several of them in fact being new to the range of Gray's Manual. Attention is also called to a few species which have been variously understood by hepaticologists and which are even now in more or less confusion with regard to their synonymy. All of the species noted, with the exception of *Kantia Sullivantii* and *Radula obconica*, also occur in Europe. The arrangement follows that of Schiffner in Engler and Prantl's "Die Natürlichen Pflanzenfamilien."

1. RICCIA CRYSTALLINA L. A few specimens of this well known species were collected by E. B. Harger at Oxford, Connecticut, in 1898. The plant has a rather wide distribution in North America but has not hitherto been reported from any stations nearer than Illinois.

2. GYMNOMITRIUM CORALLIOIDES Nees, Naturgeschichte der europ. Lebermoose, 1: 118. 1833. *Acolea corallioides* Dumort. Recueil d'Obs. sur les Jung. 23. 1835. *Cesia corallioides* Carruth. Jour. Bot. 3: 300. 1865. A few fragments of this distinctly alpine species were found in 1897 by Professor Farlow on Mt. Washington, and during the past summer the writer collected several additional specimens along the Crawford Bridle Path. The only North American stations for the species which have hitherto been recorded are Alaska, the Yukon Territory and Greenland, and its discovery in the White Mountains is therefore of much interest. *G. corallioides* often grows in company with *G. concinnatum*, which is rather abundant in the White Mountains at high altitudes. The former is however a smaller species with more closely imbricated leaves and its color,

which varies from gray to brownish-black, does not show the yellowish tints which are occasionally seen in the commoner species. *G. coralloides* is further distinguished by its hyaline leaf-margins.

3. MARSUPELLA USTULATA (Hüben.) Spruce, Rev. Bryol. **8**: 100. 1881. *Gymnomitrium adustum* Nees, Naturgeschichte der europ. Lebermoose, **1**: 120. 1833 (in part). *Jungermannia ustulata* Hüben. Hep. Germ. 132. 1834 (*teste* Spruce). *Sarcoscyphus adustus* Spruce, Ann. and Mag. Nat. Hist. II. **4**: 196. 1849. *Nardia adusta* Carringt. Brit. Hep. 20. 1874. *Sarcoscyphus Sprucei* Limpr. Jahresb. Schles. Gesell. vaterl. Cultur, **58**: 179. 1881. *Sarcoscyphus ustulatus* Kiær, Christiania Vidensk. Selsk. Forhandl. 1884[12]: 82. *Marsupella adusta* Underw.; A. Gray, Manual, 721. 1890 (not Spruce). *Marsupella Sprucei* Steph. Bull. de l'Herb. Boissier, II. **1**: 156. 1901. The present species is not uncommon in the alpine region of the White Mountains and has been found there by several collectors. It is much smaller than either *M. emarginata* or *M. sphacelata* and may be distinguished also by its very dark purplish-black color and by its paroicous inflorescence. It is probable that other minute *Marsupellae* occur in the higher mountains of New England but none of them have yet been detected with certainty. For a long time it was supposed that *M. ustulata* was identical with *Gymnomitrium adustum* Nees, but, as Limpricht pointed out, this old species was a composite and included two species of *Marsupella* as well as a true *Gymnomitrium*. Reserving the name *adustum* for the latter he gave the name *Sarcoscyphus Sprucei* to one of the species of *Marsupella* and *S. pygmaeus* to the other. A few months later Spruce described *M. ustulata* as a *new species* and applied the name *M. adusta* to the *Gymnomitrium*. This was in accordance with Spruce's view that *Marsupella* and *Gymnomitrium* were not generically distinct. Stephani recognizes both *M. ustulata* and *M. Sprucei* as distinct species, but other European writers consider them to be forms of a single species, an opinion with which the writer would also agree. In the latter case Spruce's name would apparently have to be discarded on account of the slight priority of Limpricht's. According to Pearson,[1] however, Spruce himself came to the conclusion that *M. ustulata* was the same as the old *Jungermannia ustulata* of Hübener, but whether he based his opinion on an examination of Hübener's type does not appear. *J.*

[1] Hep. Brit. Isles, 382. 1901.

ustulata was long ago reduced by Nees von Esenbeck to a synonym of *Sarcoscyphus Ehrharti* (= *Marsupella emarginata*),[1] and until it was revived by Pearson had practically disappeared from hepaticological literature.

4. NARDIA HAEMATOSTICTA (Nees) Lindb.[2] This species was discovered by the writer close to the Crawford Bridle Path in the summer of 1902. Only two other North American localities, Greenland and Alaska, have been recorded.

5. NARDIA HYALINA (Lyell) Carringt. No New England stations for this species are given in the Manual, but apparently it is not uncommon. Specimens from the following localities are in the writer's herbarium: Jerusalem, Maine (*J. F. Collins*); Newfane, Vermont (*M. A. Howe*); Middletown and Hamden, Connecticut (*A. W. E.*). Specimens have also been examined from Massachusetts.

6. LOPHOZIA BICRENATA (Schmid.) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia bicrenata* Schmid. Ic. Plant. 3: 250. *pl. 64, f. 2.* 1797. By most American authors this species has been referred to *J. excisa* Dicks., and it is described under this name in the sixth edition of the Manual. It is probable that the true *J. excisa* was a composite species including among others the *J. bicrenata* of Schmidel, but there is so much uncertainty about it that some European writers have given up the name altogether while others reserve it for *J. capitata* Hook. (= *J. intermedia* Lindenb.), a very different species from *Lophozia bicrenata*. *J. capitata* is described in the Manual as *J. excisa*, var. *crispa* Hook. and has not yet been definitely reported from New England. *L. bicrenata* on the contrary is not uncommon and is usually found growing on the earth in woods or along their borders. It has been collected from near the coast to an altitude of 5000 ft. in the White Mountains and does not vary markedly in different localities. To the description given in the Manual it may be added that the inflorescence is paroicous and that the plants, which are usually more or less tinged with reddish, commonly give off a peculiar aromatic odor. New England specimens from the following stations are in the writer's herbarium: Crawford Bridle Path and Jackson, New Hampshire (*A. W. E.*); Andover,

[1] Naturgeschichte der europ. Lebermoose, 2: 417. 1836.

[2] A full description of this species by the writer may be found in Proc. Wash. Acad. 2: 296. 1900.

Vermont (*W. G. Farlow*); Woods Holl, Massachusetts (*A. W. E.*); Orange and Hamden, Connecticut (*A. W. E.*).

7. LOPHOZIA FLOERKII (Web. & Mohr) Schiffn.; Engler & Prantl, Nat. Pflanzenfam. 1[3]: 85. 1893. *Jungermannia Floerkii* Web. & Mohr, Bot. Taschenb. 410. 1807. *J. Naumanni* Nees; Martius, Fl. Crypt. Erlang. 143. *pl. 4, f. 16.* 1817. *J. barbata*, var. *Floerkii* Nees, Naturgeschichte der europ. Lebermoose, **2**: 168. 1836. *J. lycopodioides*, var. *Floerkii* Lindb. Musc. Scand. 7. 1879. Mt. Washington, New Hampshire (*W. G. Farlow, A. W. E.*).

8. LOPHOZIA LYCOPODIOIDES (Wallr.) Cogn. Bull. Soc. roy. Bot. de Belgique, **10**: 278. 1872. *Jungermannia lycopodioides* Wallr. Fl. Crypt. Germ. **1**: 76. 1831. *J. barbata*, var. *lycopodioides* Nees, Naturgeschichte der europ. Lebermoose, **2**: 185. 1836. Mt. Katahdin, Maine (*J. F. Collins*); Thorn Mt. and Carter Dome, New Hampshire (*A. W. E.*).

9. LOPHOZIA LYONI (Tayl.) Steph. Bull. de l'Herb. Boissier, II. **2**: 157. 1902. *Jungermannia quinquedentata* Huds. Fl. Angl. 511. 1762? Web. & Mohr, Bot. Taschenb. 430. 1807? *J. barbata*, var. *quinquedentata* Nees, Naturgeschichte der europ. Lebermoose, **2**: 196. 1836. *J. Lyoni* Tayl. Trans. Bot. Soc. Edinburg, **1**: 116. *pl. 7.* 1844. *Lophozia quinquedentata* Cogn. Bull. Soc. roy. Bot. de Belgique, **10**: 279. 1872. Mt. Kineo, Moosehead Lake, Maine (*M. L. Fernald*); Jackson, New Hampshire (*A. W. E.*); Mt. Mansfield, Vermont (*W. G. Farlow*); Meriden, Connecticut (*A. W. E.*).

The three species just quoted together with *L. gracilis* (Schleich.) Steph. (= *Jungermannia barbata*, var. *attenuata* Mart. of the Manual) have sometimes been regarded as distinct species, sometimes as well marked varieties of *L. barbata* (Schreb.) Dumort. Nearly all recent writers hold to the former view, recognizing five northern species in the "*barbata*"-group, but Pearson recognizes only four species looking upon *L. Floerkii* as a variety of *L. lycopodioides*, an opinion which has the sanction of Lindberg. With a little care it is not difficult to distinguish these five species, and, with the exception of *L. Floerkii* and *L. lycopodioides*, they show no tendency to vary into one another. *L. gracilis* is not uncommon in mountainous regions and is the smallest species of the group. It may usually be recognized at a glance by its upright flagelliform branches which bear gemmae near the apex and closely appressed leaves in the lower part. These branches, which are similar in appearance to the gemmiparous

branches of *Odontoschisma denudatum* and *Kantia Trichomanis* are sometimes very abundant, covering over an entire tuft of the plant, but sometimes they are very sparingly produced.

Of the other four species *L. barbata* and *L. Lyoni* agree with each other in having inconspicuous or obsolete underleaves and in lacking marginal appendages of any sort near the postical bases of the leaves, while *L. Floerkii* and *L. lycopodioides* agree in having large and conspicuous bifid underleaves and in developing clusters of slender branched cilia near the postical leaf-bases. *L. barbata* is rather more robust than *L. Lyoni*, but the most reliable differential characters are drawn from the leaves. In *L. barbata* these have their antical and postical margins of about the same length and approximately parallel, while the teeth at the truncate apex are three or four in number, subequal in size and obtusely or subacutely pointed. If we should pass a straight line through these teeth, it would lie parallel or nearly so with the axis of the stem. In the leaves of *L. Lyoni* the postical margin is strongly curved and is much longer than the antical, the sharply pointed teeth are commonly three in number and the postical tooth is considerably larger than the others. If we should pass a straight line through these teeth, it would form an acute angle with the axis. *Lophozia Lyoni* is commonly known as *L. quinquedentata*, but there is so much doubt as to what the original *Jungermannia quinquedentata* really was that it seems best to discard the name altogether, as both Pearson and Stephani have recently done, and to take up the later name of Taylor, about which there is no doubt whatever.

The differences between *L. lycopodioides* and *L. Floerkii* are those of degree rather than of kind. *L. lycopodioides* is the more robust of the two, its leaves are larger and more crispate, the teeth are often mucronate instead of being bluntly pointed, the basal cilia are more abundant and more finely divided and the divisions of the underleaves are more conspicuously ciliate. Typical specimens can be distinguished from each other at a glance, but one occasionally meets with forms which are difficult to refer definitely to either species and which apparently represent intermediate forms. As has already been noted both species are almost universally recognized in spite of this fact.

10. Lophozia Marchica (Nees) Steph. Bull. de l'Herb. Boissier, II. 2: 48. 1902. Stephani has recently reduced to this species, as

a synonym, *Jungermannia Mildeana* Gottsche,[1] a form which most European writers have considered distinct. If this reduction is made, and it certainly seems justifiable, then the writer's *J. Novae-Caesareae*,[2] although recognized by Stephani, should apparently share the same fate. Accepting *L. Marchica* in this broad sense it is now known from three New England stations: Beach Mt., Mt. Desert Island, Maine (*E. L. Rand*); Woods Holl, Massachusetts (*A. W. E.*); East Haven, Connecticut (*A. W. E.*). The species is essentially a bog-plant and is commonly found creeping through tufts of *Sphagnum*; in some cases however the plants may be completely covered with water, while in other cases, especially when growing in sandy bogs, they may be exposed to dryness. The plants vary markedly according to the amount of water which they receive, a liberal supply producing elongated stems with scattered leaves while a scanty supply produces short stems with closely crowded leaves. The cell-structure is also variable. Protected and shaded leaves show thin and delicate walls, while leaves exposed to the sun show thickened yellowish walls with more or less conspicuous trigones. A single leaf in fact may show these variations in cell-structure. The dark purple stems which are characteristic of typical *L. Marchica* are paler in some of the other forms and sometimes show no trace of purple; in other cases the color is limited to the bases of the rhizoids and the adjacent parts of the stem. Underleaves are occasionally present in all the forms among the stem-leaves, but they are often very few in number and have the appearance of being abnormal or adventitious. Floral underleaves or bracteoles are of course invariably present.

11. KANTIA SULLIVANTII (Aust.) Underw. This delicate species is now known in New England from the two following localities: Newton, Massachusetts (*W. G. Farlow*) and Woodbridge, Connecticut (*A. W. E.*).

12. SCAPANIA CURTA (Mart.) Dumort. Although this species is not included among the *Scapaniae* described in the Manual, it has been collected near Gorham, New Hampshire, by Professor Farlow and at Jackson in the same State by the writer.

13. ANTHELIA JURATZKANA (Limpr.) Trevis. This arctic and alpine species was collected by the writer on Mt. Washington in

[1] Verhandl. der k. k. zool.-botan. Gesellschaft in Wien, **17**: 626. *pl. 16.* 1867.
[2] Bull. Torrey Club, **20**: 308. *pl. 163.* 1893.

1889. The specimens although scanty show the paroicous inflorescence characteristic of the species and are infested with the peculiar fungous growth which seems to be almost invariably present. The plant has also been reported from Greenland, California and Alaska, but these are apparently the only North American stations that have been recorded. *Scapania curta* and *Anthelia Juratzkana* have recently been described by Howe,[1] who also points out the differences between the latter species and *A. julacea* (L.) Dumort., a plant which may likewise be expected in the White Mountains.

14. Radula obconica Sulliv. The range of this species as given in the Manual is from New Jersey to Ohio. It has been collected by the writer at Hamden, Connecticut.

Yale University.

VARIATIONS OF GLAUX IN AMERICA.

M. L. Fernald.

Those who are familiar with our sea-side flora have doubtless many times come across the blue-green patches of *Glaux* occupying areas of salt-marsh near high-water mark. At any time in summer or fall the plant attracts attention, and if it is found in June or early July it immediately claims our interest by the delicate flowers in the upper leaf-axils. Although the plant belongs to the natural order *Primulaceae* it has no corolla, but instead the calyx is much developed and beautifully colored, either white, rose-pink, or crimson, with more deeply hued centre.

The plant familiar to most botanists whose sea-shore collecting has been only in New England is simple or with a few erect branches, and it has oval or broadly elliptic-oblong leaves generally a centimeter long and rounded at the tip. This erect plant is common in salt-marshes and on muddy sea-shores from the Gulf of St. Lawrence to Nantucket — and it is said to extend even to New Jersey. It was, therefore, of no special interest, in early July last, to find the common erect plant growing below tide-limit on a muddy shore at Cutler, Maine.

[1] Mem. Torrey Club, 7. 1899.

But when, in crossing the flat between Schooner Cove and Corbett's Point, Dr. George G. Kennedy drew attention to a little prostrate *Glaux*, we were greatly interested, for to the others of the party (including Messrs. Emile F. Williams, J. Franklin Collins, and the writer) this form of the plant was equally unfamiliar. The plant at Cutler formed prostrate rosettes rarely a decimeter across, its leaves were narrowly oblong and bluntly pointed, and the flowers were deeply colored throughout, the ordinary white of the calyx-tips being replaced in these plants by a bright lavender. This prostrate plant on the shore of Schooner Cove was well below the high-water mark and during a large part of the day it was completely submerged by sea-water; and since the plant there grew in a very limited area its peculiar habit and deeply colored flowers were thought to be due perhaps to the periodical salt bath it was forced to endure.

Later, however, on July 24th, Mr. Williams and the writer had the good fortune to find the little prostrate *Glaux* with the commoner erect New England form occupying many acres of salt-marsh by the Baie des Chaleurs near Bathurst, New Brunswick. There the two plants grew under identical conditions, large patches of the taller erect plant occurring side by side with equally extensive areas of its dwarf ally. Both forms were somewhat past flowering and many specimens had fairly mature fruit, and it was found that the plants differed not only in the points already noted at Cutler, but that the fruit of the erect broad-leaved form was larger than in the other. Characteristic material of the two forms from the shore of the Baie des Chaleurs was collected, and from a comparison of these and the Cutler plants with the American and Old World specimens in the Gray Herbarium and the herbarium of the New England Botanical Club the following conclusions are drawn.

The prostrate plant first noted at Cutler and afterwards found in great abundance at Bathurst is not confined in America to the "north shore," but has been collected at two points at least on the Massachusetts coast: — Rockport (*J. H. Sears*) and Somerville (*F. S. Collins*). This form proves to be the common *Glaux maritima* of northern Europe and the alkaline districts of interior Asia. But a large number of Old World specimens show that the true (European) *Glaux maritima* is not always prostrate nor even freely branched, for occasional individuals are subsimple and others have short erect branches. In its narrower pointed leaf and small fruit, however, the

Old World material is quite like the smaller plants of Bathurst and Cutler; and the larger subsimple or diffuse specimens from Europe are matched by plants collected by the writer in Maine — at Cape Elizabeth and Southport. The same narrow-leaved plant, though sometimes with a stronger tendency to fastigiate erect branching, occurs in the alkaline district of North America, from Minnesota to the Rocky Mountains.

The other form of *Glaux*, the common erect plant of the New England coast with larger oval or broad-oblong round-tipped leaves and larger fruit, does not seem to occur in Europe, although closely approached by a large simple Scandinavian plant which, however, has narrower blunt-pointed leaves. But, as shown in the Gray Herbarium, this broad-leaved form of our Atlantic coast is also on the Pacific shores from Alaska to California, and even in the interior of the latter state, and like many other characteristic plants of eastern America it occurs upon the coasts of Japan and Amur.

The distinguishing features and the distribution of the two forms of *Glaux* as now understood are:

GLAUX MARITIMA, L. Sp. 207. *Diffusely branched* (rarely simple), the branches-prostrate, loosely ascending, or sometimes erect: *leaves linear to oblong*, the larger 3 to 12 mm. long, 1.5 to 6 mm. broad, *bluntly pointed*: flowers 3 to 5 mm. long, variously colored with white, rose pink or lavender, and crimson: *mature capsule* 2 to 3 mm. long, *2 to 2.5 mm. broad.*— Locally along the coast from Baie des Chaleurs, New Brunswick, to eastern Massachusetts; in alkaline districts inland from Minnesota to Saskatchewan, Nevada and Oregon; and in Europe and interior Asia. Passing to

Var. **obtusifolia**. *Erect* (0.5 to 3 dm. high), simple or with few erect branches: *leaves oval or broadly oblong*, the principal ones 8 to 15 mm. long, 4 to 8 mm. broad, *with rounded tips: mature capsule* 3 mm. long, *2.5 to 4 mm. broad.*— Salt marshes and wet muddy or sandy seashores (rarely inland), Gulf of St. Lawrence to Nantucket; Alaska to California; and Amur and Japan. Specimens examined — QUEBEC, Anticosti (*Pursh*): NEW BRUNSWICK, Bathurst, July 24, 1902 (*Williams & Fernald*): PRINCE EDWARD ISLAND, Tracadie Beach, Aug. 6, 1901 (*Churchill*): NOVA SCOTIA, Grand Narrows, Cape Breton, July 27, 1898 (*John Macoun*, Herb. Geol. Surv. Can. no. 19,849): MAINE, Cutler, July 4, 1902 (*Kennedy, Williams, Collins & Fernald*); Mt. Desert Island, June 23, 1890 (*Faxon*); Great

Cranberry Isle, July 17, 1897 (*Williams*); Cape Elizabeth, July 18, 1861 (*Boott*); Biddeford, July, 1891 (*Regester*); Biddeford Pool, July 28, 1900 (*Kennedy*); Kennebunk, July 23, 1885 (*Swan*); Kennebunkport, July 18, 1888 (*Kennedy*); Wells, June 13, 1865 (*Boott*), July 28, 1886 (*Deane*), July 23, 1898 (*Parlin & Fernald*): MASSACHUSETTS, Somerville, June 4, 1881 (*F. S. Collins*); Nantucket, Aug. 18, 1878 (*Faxon*): ALASKA, Sitka (*Mertens, Tiling*): Juneau, July 31, 1891 (*Cooley*): BRITISH COLUMBIA, Saturna Island, 1858 (*Lyall*): Renfrew, Vancouver Island, 1901 (*Rosendahl & Brand*, no. 63): WASHINGTON, without locality, 1854 (*Cooper*); Bellingham Bay, July, 1890 (*Suksdorf*, no. 989): CALIFORNIA, Cisco, 1873 (*Bolander*); Martinez, April, 23, 1854 (*Bigelow*): AMUR, without locality (*Maximowicz*): JAPAN, Yezo, July 10, 1884 (*Miyabe*); Nambu, Nippon, 1865 (*Tschoniski*).

GRAY HERBARIUM.

POGONIA AFFINIS IN VERMONT.

L. R. JONES.

IT IS always a pleasure to learn of a more extended range or a new station for a rare orchid. This is especially true of one having so insecure a foothold as *Pogonia affinis*. Mrs. Henry Holt advised me of the discovery of what she regarded as that species the first of last June and Mr. Emile F. Williams who has kindly examined the flower and photographs since, has confirmed this opinion. Mrs. Holt found only one plant although diligent search was made for others. It was in a somewhat open, moist woodland near Burlington belonging to Mr. Henry Holt and since there is no danger that the natural environment will be changed the preservation of the station and the discovery of other plants is almost certain. Mrs. Holt transplanted this specimen to her orchid garden where it is apparently thriving; photographs and drawings were made and deposited with the dried flower in the herbarium of the University of Vermont. Mr. Williams in his recent list in RHODORA records this species from Connecticut and Massachusetts; Mrs. Holt's discovery therefore, not only adds Vermont to this list, but extends the range some two hundred miles

to the northward. Owing to its close affinity with *Pogonia verticillata* our local botanists have been stimulated to renewed zeal in their attempts to rediscover that. Robbins and Torrey found the latter near Burlington sixty or more years ago and one of Torrey's specimens is in our University herbarium, but the exact location of their station was unknown and we feared it was exterminated. The recent search was rewarded by the discovery this autumn by Mr. F. A. Ross of several sterile plants of a Pogonia which appears to be *P. verticillata.* The plants are in an open woodland in the vicinity of the Torrey station and possibly, it is the same place. One of our students, Mr. F. G. Helyar has brought us this species from Hinsdale, N. H., opposite Brattleboro, where he reports a colony of the plants, safely secluded. It has not as yet been found in that vicinity on the Vermont side of the Connecticut river.

University of Vermont.

Is Cirsium palustre a Native of New Hampshire? — I recently sent to the Gray Herbarium a thistle which I was unable to identify by the manuals at hand and have learned that the plant is *Cirsium palustre*, Scop., of Europe. As the plant seems to be unrecorded in America it may interest the readers of Rhodora to know something of the conditions under which it grows. There is a colony of this thistle on Tucker Mountain in this township (East Andover, New Hampshire), in a moist forest tangle at an altitude of about 850 feet above sea level, about two miles from the town and railroad, and well removed from cultivated grounds. I have not yet been able to investigate the extent of this colony which may spread all through the tangle of some 20 acres, but this season I saw about fifty mature plants and the same number of seedlings. The plant is very graceful, four to six feet tall, with drooping foliage, narrowly winged stem, and upright inflorescence of small heads. Some of the farmers living nearby think that this thistle has been here a long time. I cannot learn of imported stock, seeds of any kind, or anything in which seeds might have been introduced, having ever been carried upon this mountain. Has it been introduced, or is it a native of our northern woods? I should like to hear from others on this matter.— George W. Holt, East Andover, New Hampshire.

LAMIUM ALBUM IN MAINE. — In a neighbor's field there is a small well established and thrifty plot of *Lamium album*. The people who own the field have never had the plant in cultivation and until I found it last spring they did not know of its existence. More than a quarter of a mile distant, in the busy part of the town, there is a thrifty growth of the *Lamium* near an old house long used as a department of a large store. The present owner says that the horses eat the plant off several times a year and that it has no care, yet it maintains a vigorous growth. He calls the plant "Snowflake," as I was taught to do. It is possible that we may yet be able to prove it a worthy wild flower of Maine.— JENNIE M. H. MORRELL, Gardiner, Maine.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS, — X. CAREX.[1]

M. L. FERNALD.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex acutiformis, Ehrh.				+		
" adusta, Boott.	+			+		
" aenea, Fernald.	+	+	+	+		
" aestivalis, M. A. Curtis.		+		+		
" alata, Torr.		+		+	+	+
" albicans, Willd.	+	+	+	+		
" albolutescens, Schwein.	+	+		+	+	+
" alopecoidea, Tuck.	+		+			
" aquatilis, Wahl.	+	--	+	+		+
" " var. elatior, Babington	+					
" arcta, Boott.	+		+	—		
" arctata, Boott.	+	+	+	+	+	
" " var. Faxoni, Bailey.	+	+				
" " × castanea, Bailey.	+		+			
" atrata, L., var. ovata, Boott.	+	+	+			
" aurea, Nutt.	+	—	+	+	—	+
" Backii, Boott.	+	+	+	+		
" Bebbii, Olney.	+	+	+	+		

[1] Printed in RHODORA as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex Bicknellii, Britton.				+		+
" bromoides, Schkuhr.	+	+	+	+	+	+
" brunnescens, Poir.	+	+	+	+	+	+
" bullata, Schkuhr.	+	—		+	+	+
" " var. Olneyi, Fernald.				+	+	+
" canescens, L.	+	+	+			+
" " var. disjuncta, Fernald.	+	+	+	+	+	+
" " var. subloliacea, Laest.	+	+	+	+		
" capillaris, L.	+	+				
" " var. elongata, Olney.	+					
" capitata, L.		+				
" castanea, Wahl.	+		+			+
" cephaloidea, Dewey.	+	+	+	+	—	+
" cephalophora, Muhl.	+	+	+	+	+	+
" chordorrhiza, Ehrh.	+		+			
" conoidea, Schkuhr.	+	+	+	+	+	+
" Crawei, Dewey.	+					
" Crawfordii, Fernald.	+	+	+	+		
" " var. vigens, Fernald.	+	+	+			
" crinita, Lam.	+	+	+	+	+	+
" " var. gynandra, Schwein. & Torr.	+	+	+	+	+	+
" " var. minor, Boott.	+	+		+	+	
" " var. simulans, Fernald.	+	+		+		
" " × torta, Bailey.	+	+				
" cristata, Schwein.			+	+	+	+
" Davisii, Schwein. & Torr.				+		+
" debilis, Michx., var. Rudgei, Bailey.	+	+	+	+	+	+
" " var. strictior, Bailey.	+	+				+
" " × virescens, Bailey.				+		
" deflexa, Hornem.	+	+	+			
" " var. Deanei, Bailey.	+	+	+	—		
" Deweyana, Schwein.	+	+	+	+	—	+
" digitalis, Willd.	+	+	+	+	+	+
" eburnea, Boott.			+	+		+
" exilis, Dewey.	+		+	+	+	
" festucacea, Schkuhr.	+	+	+		+	
" " var. brevior, Fernald.	+	+	+	+	+	+
" filiformis, L.	+	+	+	+	+	+
" " var. latifolia, Boeckl.	+	+	+	+	+	+
" flava, L.	+	+	+	+		+
" " var. Oederi, Lilj.	+		+	+		+
" foenea, Willd.	+		+	+		+
" " var. perplexa, Bailey	+			+	+	+
" folliculata, L.	+	+	+	+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex formosa, Dewey.		—	+	+		+
" fusca, Allioni.	+		+	+	+	+
" glaucodea, Tuck.				+		+
" Goodenowii, Gay.	+	+	—	+		
" gracillima, Schwein.	+	+	+	+	+	+
" Grahami, Boott	+					
" granularis, Muhl.		+	—	+		+
" " var. Haleana, Porter.	+		+			
" Grayi, Carey.			+			+
" grisea, Wahl.	+		+	+	+	+
" " var. angustifolia, Boott.				+		+
" gynocrates, Wormsk.	+					
" hirta, L.				+		
" Hitchcockiana, Dewey.			+	+		+
" Houghtonii, Torr.	+	+	+			
" hystricina, Muhl.	+	+	+	+	—	+
" " var. Dudleyi, Bailey.	+		+	+		+
" interior, Bailey.	+	+	+	+	+	+
" " var. capillacea, Bailey.		+		+	+	+
" intumescens, Rudge.	+	+	+	+	+	+
" " var. Fernaldii, Bailey.	+	+	+	+		
" katahdinensis, Fernald.	+					
" laxiculmis, Schwein.	+	—	+	+	+	+
" laxiflora, Lam.	+	+	+	+	+	+
" " var. latifolia, Boott.			+	+		+
" " var. patulifolia, Carey.	+	+	+	+	+	+
" " var. striatula, Carey.			+	+	+	+
" " var. varians, Bailey.	+	+	+	+	+	+
" lenticularis, Michx.	+	+	+	+		
" leporina, L.	+	+		+		
" leptalea, Wahl.	+	+	+	+	+	+
" limosa, L.	+	+	+	+		+
" littoralis, Schwein.						+
" livida, Willd.	+		+	+		—
" longirostris, Torr.	+	+	+	+		+
" lupulina, Muhl.	+	+	+	+	+	+
" " var. pedunculata, Dewey.	+	+	+	+	+	+
" " var. polystachya, Schwein. & Torr.			+	+	—	+
" " × bullata, Fernald.				+		
" lurida, Wahl.	+	+	+	+	+	+
" " var. exudans, Bailey.	+	+		+	+	+
" " var. flaccida, Bailey.	+	+		+		+
" " var. gracilis, Bailey.	+	+	+			+
" " var. parvula, Bailey.	+	+	+	+		+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex lurida × lupulina, Bailey			+	+		+
" magellanica, Lam.	+	+	+	+		
" maritima, O. F. Mueller.	+	+		+		
" " var. erectiuscula, Fernald.	+					
" Michauxiana, Boeckl.	+	+	+			
" mirabilis, Dewey.	+	+	+	+	+	+
" " var. perlonga, Fernald.		+	+	+	+	+
" " var. tincta, Fernald.	+	+	+			
" Muhlenbergii, Schkuhr.	+	+	+	+	+	+
" " var. enervis, Boott.				+	+	+
" muricata, L.				+	+	
" nigro-marginata, Schwein.						+
" norvegica, Willd.	+					
" Novae-Angliae, Schwein.	+	+	+	+		
" oligocarpa, Schkuhr.			+	+		+
" oligosperma, Michx.	+	+	+	+		+
" oronensis, Fernald.	+					
" pallescens, L.	+	+	+	+	+	+
" panicea, L.	+			+	+	
" pauciflora, Lightf.	+	+	+	+		+
" pedunculata, Muhl.	+	+	+	+		+
" pennsylvanica, Lam.	+	+	+	+	+	+
" " var. lucorum, Fernald.	+	+	+	+	+	+
" pilulifera, L.	+	+	+	+	+	+
" " var. longibracteata, Lange.	+	+	+	+		
" plantaginea, Lam.	+	+	+	+		+
" platyphylla, Carey.	+	+	+	+	+	+
" polymorpha, Muhl.	+			+	+	+
" Porteri, Olney.	+					
" praecox, Jacq.				+		
" prasina, Wahl.	+	+	+	+	+	+
" pratensis, Drejer.	+					
" Pseudo-Cyperus, L.	+	+	+	+		
" " var. americana, Hochst.	+	+	+	+	+	+
" ptychocarpa, Carey.				+	+	+
" pubescens, Muhl.	+	+	+	+	—	+
" rariflora, J. E. Smith.	+					
" retrorsa, Schwein.	+	+	+	+	+	+
" " var. Hartii, Gray.		+	+			
" **retrorsa × rostrata** (*C. retrorsa × utriculata*, Fernald).						+
" rigida, Good., var. Bigelovii, Tuck.	+	+	+			
" riparia, W. Curtis.	+	+	+	+	+	+
" rosea, Schkuhr.	+	+	+	+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex rosea var. minor, Boott.		+	+	+		+
" " var. radiata, Dewey.	+	+	+	+	+	+
" " var. retroflexa, Torr.	+	+		+	+	+
" rostrata, Stokes.	+	+	+	+	+	+
" " var. ambigens, Fernald.	+					
" " var. utriculata, Bailey.	+	+	+	+		+
" rotundata, Wahl.	+					
" salina, Wahl., var. cuspidata, Wahl.	+	+		+		
" saxatilis, L.	+					
" " var. miliaris, Bailey.	+					
" " var. rhomalea, Fernald.	+					
" scabrata, Schwein.	+	+	+	+	+	+
" " × crinita, Fernald.			+			
" Schweinitzii, Dewey.			+	+		+
" scirpoides, Michx.	+	+	+			
" scoparia, Schkuhr.	+	+	+	+	+	+
" " var. condensa, Fernald.	+	+	+	+	+	+
" " var. moniliformis, Tuck.	+		+	+		
" seorsa, E. C. Howe.				+	+	+
" setacea, Dewey.			+	+		+
" siccata, Dewey.			+	+	+	+
" silicea, Olney.	+	+		+	+	+
" sparganoides, Muhl.		+	+	+	—	+
" squarrosa, L.					+	+
" stellulata, Good. (*C. echinata* of authors, not Murray).	+	+	+	+	+	+
" " var. angustata, Carey.	+	+	+	+	+	+
" " var. **cephalantha** (*C. echinata*, var. *cephalantha*, Bailey).	+			+	+	+
" " var. **excelsior** (*C. sterilis*, var. *excelsior*, Bailey).	+	+	+	+	+	+
" " var. **ormantha** (*C. echinata*, var. *ormantha*, Fernald).					+	+
" sterilis, Willd.	+			+	+	+
" stipata, Muhl.	+	+	+	+	+	+
" straminea, Willd.	+	+	+	+		+
" striata, Michx., var. brevis, Bailey.				+	—	
" stricta, Lam.	+	+	+	+	+	+
" " var. angustata, Bailey.	+	+	+	+	+	+
" " var. curtissima, Peck.	+	+		+		
" " var. decora, Bailey.	+	+	+	+	+	+
" " × salina, Bailey.				+		
" " × torta, Fernald.			+			
" styloflexa, Buckley.				—		+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Carex subulata, Michx.					+	
" tenella, Schkuhr.	+	+	+	+		+
" tenera, Dewey.	+			+	+	+
" " var. invisa, Britton.	+	+		+	+	
" " var. Richii, Fernald.				+		+
" tenuiflora, Wahl.	+		+	—		
" teretiuscula, Good.	+		+	+	+	+
" " var. ramosa, Boott.	+		+	+		+
" tetanica, Schkuhr.				+		+
" " var. Meadii, Bailey.					—	
" " var. Woodii, Bailey.				+		+
" torta, Boott.	+	+	+	+	—	+
" tribuloides, Wahl.	+	+	+	+		+
" " var. turbata, Bailey.			+			+
" " var. reducta, Bailey.	+	+	+	+		
" triceps, Michx., var. hirsuta, Bailey.	+		+	+	—	+
" trichocarpa, Muhl.				+		
" trisperma, Dewey.	+	+	+	+	+	+
" " × tenuiflora, Fernald.	+					
" Tuckermani, Dewey.	+	+	+	+	—	+
" typhinoides, Schwein.			+	+		
" umbellata, Schkuhr.	+	+	+	+	+	+
" " var. brevirostris, Boott.	+	+				
" " var. tonsa, Fernald.	+					+
" vaginata, Tausch.	+		+			
" varia, Muhl.	+	+		+	+	+
" " var. colorata, Bailey.	+	—		+		+
" vesicaria, L.	+	+	+	+	+	+
" " var. distenta, Fries.	+		+			
" " var. jejuna, Fernald.	+	+	+	+	+	+
" " var. monile, Fernald.	+	+	+	+	+	+
" vestita, Willd.	+	+		+	+	+
" " var. Kennedyi, Fernald.				+		
" virescens, Muhl.	+	+	+	+	+	+
" " var. costata, Dewey.	+	+	+	+	+	+
" " × arctata, Fernald.		+				
" vulpinoidea, Michx.	+	+	+	+	+	+
" Willdenovii, Schkuhr.	+			+		+
" xanthocarpa, Bicknell.	+	+	+	+	+	+
" " var. annectans, Bicknell.			-	+		+

Notes upon the above List.— *Carex Emmonsii*, var. *elliptica*, Boott, is *C. albicans*, Willd., while *C. Emmonsii*, Dewey, is identified

with *C. varia*, Muhl. The latter species is abundant in Rhode Island; but in Bennett's Plants of Rhode Island only the former is listed. Since *C. albicans* (*C. Emmonsii*, var. *elliptica*) is a plant of the interior calcareous districts, its report from Rhode Island was presumably a mistake for the common *C. varia* of the coastal regions.

Carex flava. Six marked forms of *C. flava* and *C. Oederi* occur in New England, and all these forms are identified with well known Old World varieties. At present, however, the group is in need of critical revision, impossible to accomplish satisfactorily in American herbaria; and until the American forms can be properly examined in the light of authentic European material they have been roughly classified into

C. flava, L. Beak as long as the body of the perigynium, often becoming bent or retrorse, at least at maturity.

Var. *Oederi*, Lilj. Beak distinctly shorter than the body of the perigynium, straight or scarcely bent, ascending or horizontally spreading, hardly retrorse.

It is hoped that a more satisfactory treatment of the forms can soon be made.

Carex Goodenowii, Gay, Ann. Sci. Nat. ser. 2, xi. 191 (*C. vulgaris*, Fries, Nov. Mant. iii. 153. *C. rigida*, var. *Goodenovii*, Bailey in Gray, Man. ed. 6, 735 c), a plant of the coastal plain, presents many forms from 0.5 to 9 dm. high, with pistillate spikelets from 0.5 to 7 cm. long. Field-study shows these extremes to be largely due to conditions of soil and exposure and to merit no separation into varieties. This species primarily of the coastal regions has the perigynia faintly nerved below, and its leaves (rarely 3 mm. broad) are *involute* at the margin in drying. (See note on *C. rigida*.)

Carex limosa was reported in Bennett's Plants of Rhode Island from Johnston and Quidnessett. No Johnston material is preserved in the Bennett herbarium; but the Quidnessett specimen labelled *C. limosa* proves to be *C. filiformis*.

Dr. P. A. Rydberg has recently proposed the name *Carex praticola* (1900) to replace *C. pratensis*, Drejer (1841), because of the earlier *C. pratensis*, Hose (1797); and in a recent treatment[1] of the plant I have followed Dr. Rydberg. Upon more recent study, however, I am unable to find references to Hose's species by European caricologists, and until that is more clearly shown to be a valid species it is

[1] Proc. Am. Acad. xxxvii. No. 17, 471 (1902).

better to retain for the plant of Greenland and North America the well established name of Drejer.

Carex rigida, Good., with short dark spikelets, occurs in extreme northern Europe and America and in the Rocky Mountains. Our representative, var. *Bigelowii*, Tuck., occurs also in northern Europe and it differs only in its taller habit and looser spikelets from typical *C. rigida*. It is a plant of arctic and alpine districts, quickly separated from the lowland *C. Goodenowii* (see note above) by its looser purplish spikelets and nerveless perigynia, and especially by its broad leaves (3 to 6 mm. broad) which have *revolute* margins in drying.

In the Herbarium of Brown University there is a sheet of loose material of *Carex Schweinitzii* marked by the late J. L. Bennett "Rhode Island." There is, however, a sheet of similar material from S. U. Cowles collected in Cortland Co., New York; and it is probable that the other sheet was labeled "Rhode Island" through some misinterpretation.

All the Vermont material which the writer has received as *Carex squarrosa* is better referred to *C. typhinoides*.

Since discussing[1] in detail as *Carex echinata* the plant long known to European and American botanists as *C. echinata*, Murray, or *C. stellulata*, Goodenow, I have received from Mr. Theodor Holm permission to use a quotation from a letter sent to him by Mr. C. B. Clarke, the eminent student of the *Cyperaceae*. Mr. Clarke, as quoted by Mr. Holm in a recent letter, wrote under date of June 30, 1901: "C. echinata, Murr. is = C. divulsa, Gooden. and *not near* C. stellulata, Gooden. The original sheet of Murray is in the British Museum, inscribed in his own hand as his *echinata*; it is a very good specimen, and Jas. Britten (or any other botanist at the British Museum) will tell you that there can be no dispute about this identification." The names *C. echinata* and *C. stellulata* have long been interchangeable in European and American botanical literature; but as a result of Mr. Clarke's identification of the Murray type the name *C. echinata* must be applied to another European plant, while the circumboreal species, represented by various forms in Europe, Asia, and America, must be called *C. stellulata*, Goodenow.

Carex stricta, Lam., presents very diverse forms, but a study of

[1] Proc. Am. Acad. xxxvii. no. 17, 453–456, 483–484 (1902).

these fails to show any characters by which they can be clearly separated. . *C. Haydeni*, Dewey (*C. aperta*, Carey, not Boott. *C. stricta*, var. *decora*, Bailey) is often separated specifically, but none of the characters relied upon for its separation are sufficiently constant to justify its specific recognition. All the forms of *C. stricta* pass too freely into one another, and any division of the species is necessarily arbitrary; but, in the main, the following arrangement will be found to cover the more marked extremes in New England.

Perigynium elliptic, tapering about equally at tip and base.
Pistillate spikelets densely flowered, slightly if at all attenuated at base, mostly pistillate throughout: scales blunt, shorter than or equaling, rarely exceeding, the perigynia.
Pistillate spikelets 2 to 7 cm. long. . . . *C. stricta.*
Pistillate spikelets 0.5 to 1.5 cm. long. *C. stricta*, var. *curtissima.*
Pistillate spikelets rather loosely flowered, long-attenuate at base, 2 to 12 cm. long, the upper often with staminate tips: scales acutish, equalling or exceeding the perigynia. *C. stricta*, var. *angustata.*
Perigynia obovate to orbicular, rounded at tip, much shorter than the attenuate scales: pistillate spikelets mostly dense, 1 to 4 cm. long. *C. stricta*, var. *decora.*

Carex **trisperma × tenuiflora.** Leaves and culms blue-green; the former 1.5 to 2 mm. broad; the latter stiff, 3 to 6 dm. high, sharply triangular; spike stiff; spikelets 2 to 4, distinct or the upper approximate, the lowest mostly 0.5 to 1.5 cm. apart, elliptic, 4 to 7 mm. long, bractless, or the lowermost with a subtending bract which often equals or exceeds the spike: scales ovate, whitish with green midribs, blunt or acutish: perigynia (rarely well developed) elliptic, 3 to 3.2 mm. long, 1.5 mm. broad, about 7-nerved on either face, with a short hyaline beak.—With the two parents, in an arbor-vitae swamp, Fort Fairfield, Maine, July 19, 1902 (*E. F. Williams, J. F. Collins, & M. L. Fernald*—Plantae Exsiccatae Grayanae, no. 110).

Exactly intermediate in habit between the two parent species. The color and stiff habit suggest *C. tenuiflora*; the frequent long bracts are those of *C. trisperma*; while the lowest spikelets are more remote than in *C. tenuiflora*, but distinctly more approximate than in the more delicate flexuous *C. trisperma*. The small perigynium, when well developed, is similar to that of *C. tenuiflora*, but with a definite though short hyaline beak (shorter than in *C. trisperma*, longer than in *C. tenuiflora*): while the faces are more distinctly nerved than in *C. tenuiflora*, though less abundantly so than in *C. trisperma*.

The following species and varieties, formerly reported from Ver

mont, are not admitted to the recent Flora of Vermont by Brainerd, Jones, & Eggleston, and are consequently omitted from the present list of Vermont *Carices*: — *Carex Crawei*, *C. gynocrates*, *C. rosea*, var. *radiata*, *C. striata*, *C. Shortiana*, *C. tetanica*, var. *Meadii*, *C. trichocarpa*, *C. varia*, *C. vestita*.

Two European species, *Carex fulva*, Good., and *C. laevigata*, J. E. Smith, were found, early in the last century by B. D. Greene, introduced at Tewksbury, Massachusetts. They have apparently quite disappeared from the original station. *C. fulva*, known to Goodenow from "America and Newfoundland," occurs in bogs on Anticosti and may yet be found on the eastern coast of Maine.

Carex Careyana is included by Professor Bailey in the 6th edition of Gray's Manual from New England, but no more definite record has been found for this species usually confined to the Alleghanies and the region further west. The nearest approach of the plant to New England seems to be in Jefferson Co., west of the Adirondacks, in New York.

Carex elachycarpa, a species recently described from northern Maine, proves upon study of more abundant material in various stages of development to belong to some other genus of the *Cariceae*, and the species is consequently omitted from the foregoing list.

Suggestions for Special Observations.

Certain species so closely approach the borders of states in which they have not yet been detected that it is perhaps worth while to call attention to them, that local botanists may know where these plants are specially to be sought.

Carex aenea occurs in Sheffield, Berkshire Co., Massachusetts (*Hoffmann*) and should be sought in adjacent Litchfield Co., Connecticut.

Carex aestivalis, found at the base of Mount Monadnock (*Churchill*) and in the intervales of the Cold River, Cheshire Co., New Hampshire, on Grey Lock and Saddle Mountains, Berkshire Co., Massachusetts (*Wm. Boott*), and from Pennsylvania southward, should be sought in southern Vermont and western Connecticut.

Carex albolutescens, usually confined to the coastal plain, has been found on Mount Monadnock, New Hampshire (*R. M. Harper*), on the Dome (Mt. Everett) at Sheffield, Berkshire Co., Massachusetts (*Hoffmann*), and in the adjacent mountains of Columbia Co., New

York (*Hoysradt*). It is to be looked for in the Taconic Range in southern Vermont.

Carex alpina, Swartz, is reported from the Restigouche River, New Brunswick, and should be sought along the St. John and its tributaries in Maine.

Carex Bebbii is known in western Berkshire Co., Massachusetts, quite to the southern border, Sheffield (*Hoffmann*), and is probably in adjacent Litchfield Co., Connecticut.

Carex Bicknellii is known as far north as Fitchburg and Shirley, Massachusetts (*W. P. Conant*) and may be expected in southern New Hampshire. It occurs in southern Worcester Co., Massachusetts (*Harper*) and is probably in northwestern Rhode Island.

Carex canescens, in its typical northern form, grows among the Green Mountains of Vermont and has been found at Southington, Connecticut (*Bissell*). It should be looked for in western Massachusetts.

Carex capillaris, var. *elongata*, grows in arbor-vitae swamps of Aroostook Co., Maine and Cortland Co., New York. It may be expected in similar situations in northern New Hampshire and Vermont.

Carex capitata. The summit of Mount Washington, New Hampshire, is the only known American station east of Hudson Bay, but the plant should be sought on Katahdin and the other high mountains of north-central Maine.

Carex castanea occurs in the Connecticut and Champlain valleys of northern Vermont, and should be watched for in northwestern New Hampshire. It is also at Salisbury, Connecticut (*Oakes*) and is to be expected in Berkshire Co., Massachusetts.

Carex chordorhiza approaches the Massachusetts border at Pownal, Vermont (*Churchill*) and should be found in the swamps of Berkshire County.

Carex concinna, R. Br., reported from the Restigouche River, New Brunswick, may be watched for in Aroostook Co., Maine.

Carex Crawei follows the St. Lawrence valley from the Great Lakes to Anticosti (*Macoun*) and extends southward on marly or calcareous shores to the Aroostook River, Maine, and to Herkimer Co., New York. It is to be expected in the Champlain valley.

Carex eburnea occurs on calcareous rocks in Victoria Co., New Brunswick and will doubtless be found in adjacent portions of Aroostook Co., Maine.

Carex exilis is frequent in bogs of Essex Co., Massachusetts, and will probably be found in adjacent New Hampshire. It is found in Rhode Island and on Long Island, New York, and may be sought in the coastal swamps of Connecticut.

Carex Grayi, occurring very locally in Vermont, eastern New York, and in central Connecticut, may be looked for in western Massachusetts.

Carex gynocrates abounds in arbor-vitae swamps of northern and central Maine and is found in swamps in Herkimer Co., New York. It should be sought in similar habitats in northern New Hampshire and Vermont.

Carex leporina, known from hillsides of Cheshire Co., New Hampshire (*Rand, Robinson, etc.*) and from the Adirondacks of New York (*Haberer*), should be watched for in Vermont.

Carex lurida, var. *gracilis*, frequent in Vermont and now known from one station in Connecticut, should be found in Western Massachusetts.

Carex magellanica follows the mountains to southern Berkshire Co., Massachusetts — Becket, etc. (*Dewey*) — and is likely to be found in Litchfield Co., Connecticut.

Carex Novae-Angliae, long known from Berkshire Co., Massachusetts, extends at least to Corry, Pennsylvania (*Churchill*) and may occur in western Connecticut.

Carex oligosperma, known from scattered swamps in Massachusetts and from Groton, Connecticut (*Graves*) is to be sought in Rhode Island.

Carex pedunculata, found at Southbridge, Massachusetts (*Harper*) and at Franklin, Connecticut (*Graves*) should be expected in northwestern Rhode Island.

Carex polymorpha occurs at Wells, Maine (*Blake*) and may be sought in adjacent New Hampshire.

Carex scirpoidea, found at 2000 ft. altitude on Mount Equinox in southwestern Vermont (*Miss Day*) should be carefully sought on Mount Grey Lock, Massachusetts.

Carex sterilis (*C. atlantica*, Bailey), usually confined to coastal swamps from the Gulf of St. Lawrence to Florida, occasionally occurs inland in Maine, in Hartford County, Connecticut, and in Essex Co., New York, and may be watched for in New Hampshire and Vermont.

Carex striata, var. *brevis*, follows the sandy coast of New Jersey, Long Island, and Cape Cod (Bailey, Evolution of Our Native Fruits, 416) and may be expected in the drier sections of southern Connecticut.

Carex subulata, known from Long Island, New York, and from Washington Co., Rhode Island (*Thurber*), may be looked for in southeastern Connecticut.

Carex tenuiflora, frequent in arbor-vitae swamps of Maine and northern Vermont, will doubtless be found in northern Coos Co., New Hampshire.

Carex teretiuscula, occasional in swamps of southern York Co., Maine (*Parlin*) and Essex Co., Massachusetts (*Sears*), may be expected in southeastern New Hampshire.

Carex trichocarpa occurs in northwestern Berkshire Co., Massachusetts (*Churchill*) and will probably be found in Bennington Co., Vermont.

GRAY HERBARIUM.

SEED-THROWING OF VIOLA.—The article of R. G. Leavitt on "Seed Dispersal of Viola rotundifolia" in the September RHODORA I read with much interest. When I began to cultivate plants in a botanic garden some twenty-five years ago, I thought it would be very nice to have as many kinds of violets as I could get, growing close together in one group. All went well for about three years when I found my plants hopelessly mixed, because the seeds were shot several feet from the parent plants. For a long time I have planted the violets each in a separate place about the garden to enable me to keep them pure. The best shooter of the lot is *Viola alpestris*, which frequently scatters its seeds ten feet in either direction.—W. J. BEAL, Agricultural College, Michigan.

Vol. 4, no. 46, containing pages 191 to 206, was issued 18 October, 1902.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4 December, 1902 No. 48

THE VARIATIONS AND DISTRIBUTION OF AMERICAN CRANBERRIES.

M. L. Fernald.

(Plate 40.)

The American Variety of Vaccinium Vitis-Idaea.

The Mountain or Rock Cranberry abounds on the eastern coast and on the mountains of New England where it has long been familiar to botanists and where, either from its lustrous box-like foliage, its delicate rose-pink flowers, or its clusters of tart dark red berries so often gathered for sauce and pies, it is better known than are most of our plants to the non-botanical visitor. The plant has long prostrate stems which creep and freely root in the crevices of rocks or in damp carpets of moss, and from which spring the densely leafy branches. On bare slopes and dry plains the branches are very short and often prostrate, and the plant forms close mats rising only 3 or 4 centimeters above the surface of the ground. In more favorable situations, as the mossy crests of headlands and cliffs, the plant is of looser habit and the branches, rising through the moss, are suberect and 8 or 10 (very rarely even 15 or 20) centimeters long. The oblong-obovate lustrous leaves are very thick and coriaceous like those of the box, with strongly revolute ma gins, and they vary in size from 0.5 to 1.8 cm. long and 4 to 9 mm. broad. The flowers in terminal clusters are bright rose-pink or tinged with deep red.

This little evergreen shrub ordinarily only a few centimeters high, with leaves usually about a centimeter long and with bright rose or red-tinged flowers, occurs throughout arctic America, extending south to the mountains of Maine, New Hampshire and Vermont, the

coast of Cape Ann, Massachusetts, the Great Lakes, and British Columbia. It occurs also on the islands of Behring Sea, and from Kamtschatka to Japan, in Greenland, and very locally on the mountains of Europe.

True *Vaccinium Vitis-Idaea*, the *Preisselbeere* of Germany, *Cowberry* of England, *Lingonris* of Sweden, and *Tyttebaer* of Denmark and Norway, is a much larger plant than our Mountain Cranberry, the branches sometimes 2 to 2.5 dm. (8 to 10 inches) high, the thinner leaves 1.5 to 2.7 cm. long, 7 to 16 mm. broad; and the flowers are white or pale pink.

By European authors the differences between this typical large-leaved form and the small-leaved variety have often been noted, but by American students these distinctive points have been very generally overlooked. In fact, Dr. Gray, following the then established precedent of treating the European and American plants as one, seems to have drawn his description from European specimens for in the first edition of the Manual (1848) the plant is described as "6′–10′ high," a stature double that ordinarily reached by the American form. This statement of the height has been repeated unchallenged in the later editions of the Manual, though altered by Dr. Gray in the Synoptical Flora to the more satisfactory "3 inches to a span or more high," thus covering the average height of the American and the extreme height of the European forms. In the most recent exhaustive treatment of the genus *Vaccinium*, however, the traditional statement "Plants low (6–10 inches)"[1] occurs. Thus for more than a half century, in spite of the modification to "3 inches" made by Dr. Gray in 1878, the unfortunate "6–10 inches" has been forced to serve as an unattainable goal for the lowly plant of our mountains and coast.

Pursh alone among those who have specially commented on the two extremes has said, "The American plant is more robust than the European, and the leaves are considerably larger,"[2] a statement which, in view of the facts, seems quite reversed from the meaning probably intended by its author. By others, however, the larger plant has been consistently treated as the normal and common form

[1] Munson, Me. Agr. Expt. Sta. Bull. No. 76, 138 (1901), and in Bailey, Cyc. Am. Hort. 1892 (1902).

[2] Pursh, Fl. 289 (1814).

of Europe, while the infrequent occurrence of the dwarf form on the mountains of northern Europe has been considered worthy of special comment. Thus in 1821 Sir William Hooker in his Flora Scotica (118) said "A dwarf variety, very bushy, with leaves much crowded, and only half the size of the common plant, but having flowers full as large, is found by *Mr. Murray* on the Campsie hills, near Glasg-[ow], and on hills in Arran. This retains its characters in the gardens, where in England it has been long known under the name of *V. buxifolium*."[1]

In 1825 an excellent plate of the dwarf plant was published by Loddiges as *Vaccinium Vitis-Idaea minor*, "a very pretty variety of the Vitis-idaea: it is a native of the north of Europe and America, and is a low evergreen shrub, growing not more than four or five inches in height, and flowering with us [in England] in May and June."[2] The varietal name *minor*, applied by Loddiges to the small American plant, was obviously in contradistinction to his *Vaccinium Vitis-Idaea major* "which grows in many of the northern parts of Europe," and which he had previously illustrated.[3]

Early in the last century Chamisso, botanist to the Romanzoff expedition, collected in Kamtschatka and on the island of Unalaska the small form characteristic of North America, and soon thereafter Mertens collected the same plant at Sitka. A specimen of the Unalaska plant in the Gray Herbarium is labelled in the handwriting of Chamisso "*Vaccinium Vitis-Idaea* L. var.," and in commenting upon the plant its collector compared its small foliage with that of the Greenland form of the species: "Parvitate foliorum cum speci-minibus groenlandicis convenit."[4] The Mertens specimens collected at Sitka were likewise distributed as an unnamed variety, while Bongard who critically studied them emphasized their divergence from the European type: "Foliorum parvitate ab europaea planta recedens."[5]

At about the same time Ernst Meyer identified[6] the American plant with the small form mentioned by Hooker as *Vaccinium*

[1] Possibly *V. buxifolium*, Gilib. Fl. Lituan. i. 4 (1781), which is referred by European authors to *V. Vitis-Idaea*.

[2] Loddiges, Bot. Cab. xi. no. 1023 (1825).

[3] Loddiges, l. c. vii. no. 616 (1822). [4] Cham. & Schl. Linnaea, i. 526 (1826).

[5] Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832).

[6] E. Meyer, Pl. Labr. 55 (1830).

buxifolium from the Scotch Highlands; and in 1837 Hornemann described the small plant of Greenland as *V. Vitis-Idaea*, var. *pumilum*.[1] Under this name the Greenland plant has since been known to the Danish botanists, and it was described by Lange and beautifully illustrated in Flora Danica (xvii. t. 2960). More recently Lange has recognized in Labrador material the Greenland plant, but at the same time he considered the American plants in the main identical with the European: "Hovedformen i Nord-Amerika, Sibirien, hele Europa."[2]

Thus by different European authors the plant of Alaska and of Labrador has been distinguished from the commoner form of the plant in Europe and identified with var. *pumilum* of Greenland and the local plant described by Hooker from the Scotch Highlands, while by Loddiges as early as 1825 the American form was distinguished as var. *minor*. In a large series of American material the writer has been unable to find any specimens which can be satisfactorily identified with the large-leaved plant of Europe. All the American material agrees, however, with the Greenland and Alaska plants and these are well represented by the plate of var. *minor*, Loddiges. Under this name, then, the American plant should be known.

The more important bibliography of the dwarf small-leaved form is as follows:

VACCINIUM VITIS-IDAEA, L., var. MINOR, Loddiges, Bot. Cab. xi. no. 1023 (1825). *V. Vitis-Idaea*, American authors. *V. buxifolium*, Hook. Fl. Scot. 119 (1821). *V. Vitis-Idaea*, var., Cham. & Schl. Linnaea, i. 526 (1826); Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832). *V. Vitis-Idaea*, var. *pumilum*, Hornem. Oec. Pl. ii. 177 (1837); Lange, Fl. Dan. xvii. t. 2960, and Fl. Groenl. 90. *V. Vitis-Idaea*, var. *microphyllum*, Herder, Acta Hort. Petrop. i. 313 (1872). *Vitis-Idaea Vitis-Idaea*, Britton, Man. 706 (1901), as to American plant.

VACCINIUM OXYCOCCUS AND MACROCARPON.

The Large Cranberry, *Vaccinium macrocarpon*, the common species of coastal bogs in eastern America, is readily distinguished in

[1] Horn. Oec. Pl. i. 177 (1837). [2] Lange, Fl. Groenl. 90. (1880).

its characteristic form from the Small Cranberry, *V. Oxycoccus*. Usually *V. macrocarpon* is a coarser plant with larger obtuse veiny leaves which are pale but not whitened beneath and with very slightly revolute margin, and the pedicels of the larger flowers and fruits are produced upon an elongated rachis from the tip of which arises a leafy shoot. *V. Oxycoccus* on the other hand, in its typical form, has almost capillary stems, and the leaves are smaller than in *V. macrocarpon*, whitened beneath and so conspicuously revolute above the middle as to produce a narrow triangular acute-tipped outline. The flowers and fruits are smaller than in *V. macrocarpon* and the pedicels ordinarily arise from a very short terminal axis or rachis, although in rare individuals the rachis is elongated and proliferous as in *V. macrocarpon*. The flowers of the two species also present differential characters, the larger flowers of *V. macrocarpon* having the anthers proportionately longer than in smaller flowers of *V. Oxycoccus*.

But although the typical forms of *Vaccinium macrocarpon* and *V. Oxycoccus* are clearly enough distinguished by their ordinarily defined characters, a third plant of New England has proved more puzzling. *V. macrocarpon* is confined for the most part to grassy swamps or sandy bogs of the coastal plain or to wet shores at low altitudes inland, while *V. Oxycoccus*, at least in New England and eastern Canada, is a plant of cold sphagnum bogs or of humus. The third cranberry which has recently attracted the attention of New England botanists grows like *V. Oxycoccus* in sphagnum bogs, but superficially it seems exactly intermediate between that and the larger species of the warmer swamps. The stems are quite as coarse as in small plants of *V. macrocarpon*, the leaves, much larger than in *V. Oxycoccus*, are only slightly revolute and often quite obtuse at tip, the flowers and fruit are larger, though small for *V. macrocarpon*, and the rachis shows a decided tendency to proliferation.[1]

On account of its somewhat intermediate characters this larger plant of the New England sphagnum bogs has been thought to represent a transition between the two well-known species, or perhaps to be of hybrid origin. The latter origin of the plant is, however, quite improbable since in northern Maine it is abundant in swamps far outside the range of *V. macrocarpon*, and, furthermore, the intermediate plant is exactly matched by material from eastern Asia and

[1] Of 64 inflorescences examined, 27 (or .42) show more or less proliferation, of 90 inflorescences of *V. Oxycoccus* 18 (or .20) show proliferation, while of 140 inflorescences of *V. macrocarpon* 132 (or .94) exhibit this characteristic.

northwestern America where no *V. macrocarpon* is known to occur. This Pacific coast form, nevertheless, was taken by Sir William Hooker for the larger eastern species for he states[1] that at the mouth of the Columbia *V. macrocarpon* is very abundant. Later, however, Dr. Gray in studying the Vacciniums considered the Pacific slope cranberry best treated as a large variety of *V. Oxycoccus*.

The material now at hand shows that this intermediate form, *V. Oxycoccus*, var. *intermedium*, Gray, is not confined to northwestern America and eastern Asia as originally supposed by Dr. Gray, but that as already stated it is in the upland bogs of New England. In fact many specimens previously referred on account of their size to *V. macrocarpon* have the more pointed foliage and the characters of inflorescence of *V. Oxycoccus*, var. *intermedium*. To this form belongs the Saskatchewan material of Bourgeau formerly referred to *V. macrocarpon*, a species which apparently reaches inland only to the Great Lakes.

The characters — size of plant, size and outline of leaf, size of flower and fruit and proliferation of the flowering rachis — ordinarily relied upon to separate the circumboreal *Vaccinium Oxycoccus* and the strictly American *V. macrocarpon* are so mingled in *V. Oxycoccus*, var. *intermedium* as to render their use as final criteria too misleading. But another character apparently overlooked by students of the group very materially reinforces the traditional ones. In *V. macrocarpon*, with the flowers borne on a proliferous rachis, the pedicels bear, usually toward their tips, a pair of subapproximate leaf-like bracts. Ordinarily these bracts are 4 or 5 mm. long, green and of firm texture, but occasionally they become nearly or quite twice that size. In the smaller *V. Oxycoccus*, with the flowers on a short terminal rachis which is rarely proliferous, the pedicels bear, usually near or below their middle, a pair of lanceolate or lance-ovate often strongly involute colored bracts 1 to 2.5 mm. long. In the larger plant of the northwest, now found to occur likewise in the east, the bracts are exactly those of *V. Oxycoccus*, and, in view of its leaves with more whitened under surface, its ordinarily terminal inflorescence and its range, it is undoubtedly a very large development of *V. Oxycoccus*.

The three true Cranberries may be readily recognized by the following characters:

[1] Hook. Fl. Bor.-Am. ii. 35.

V. Oxycoccus, L. Sp. 351 (1753).— Stems slender, creeping, the branches almost capillary, erect or ascending: leaves oblong or oval, 3 to 8 mm. long, 1 to 3 mm. broad, strongly revolute, becoming narrowly triangular in outline, conspicuously whitened beneath: pedicels 1 to 4, capillary, from a terminal (rarely proliferating) short rachis (at most 3 or 4 mm. long), bearing near or below the middle 2 lanceolate or lance-ovate often involute colored bracts: corolla-segments 5 to 6 mm. long: berry 6 to 8 mm. in diameter.— In sphagnum and wet humus, boreal regions generally, coming south in America to Pennsylvania, Michigan and Wisconsin.

Var. INTERMEDIUM, Gray, Syn. Fl. ii. pt. 1, ed. 2, 396 (1886).— Coarser: leaves 6.5 to 15 mm. long, 3 to 6.5 mm. broad, acute or obtuse, only slightly revolute: pedicels 2 to 10, from a longer (often 5 to 10 mm. long) rachis: corolla-segments 6 to 8 mm. long: berry 8 to 10 mm. in diameter.— Japan, Sachalin Isl., etc.; Maine to British Columbia, south in the mountains to North Carolina and to Lake Superior and Oregon. The following eastern specimens have been examined: — MAINE, Ft. Kent, no. 2416; Blaine, no. 2417; Orono (*Fernald*): VERMONT, Colchester (*Oakes*); Willoughby (*Kennedy*): CONNECTICUT, without locality — probably Norfolk (*Robbins*): NEW YORK, western section (*Gray*): NORTH CAROLINA, without locality (*Croom*): ONTARIO, Pic River, Lake Superior (*Loring*): SASKATCHEWAN, without locality (*Bourgeau*).

V. MACROCARPON, Ait. Hort. Kew. ii. 13, t. 7 (1789).— Stems comparatively stout: leaves oblong-elliptic, blunt or rounded at the tip, 6 to 17 mm. long, 2 to 8 mm. broad, pale or somewhat whitened beneath, flat or very slightly revolute: pedicels 1 to 10, from an elongated (1 to 3 cm. long) proliferating rachis, bearing toward the tip 2 flat leaf-like bracts (4 to 10 mm. long): corolla-segments 6 to 10 mm. long: berry 1 to 2 cm. in diameter. — Open bogs and swamps, and wet shores, Newfoundland to north central Maine, Lake Champlain, and western New York, south to West Virginia and Arkansas, mostly east of the Alleghanies and on the coastal plain.

GRAY HERBARIUM.

EXPLANATION OF PLATE 40.— Fig. 1, *Vaccinium Vitis-Idaea*, tip of branch of the larger European form from the Giant Mountains, Silesia; fig. 2, *V. Vitis-Idaea*, var. *minor*, small alpine specimen from White Cap Mountain, Rumford, Maine; fig. 3, *V. Oxycoccus*, tip of flowering branch from Newton, Massachusetts; fig. 4, *V. Oxycoccus*, var. *intermedium*, tip of an original specimen from Klikitat Co., Washington; fig. 5, *V. macrocarpon*, flowering tip from Stony Creek Ponds, New York.

BRYOPHYTES OF THE MT. GREYLOCK REGION,— II.

A. LE ROY ANDREWS.

The observations of another summer upon the bryophytes of the Mt. Greylock region go far to swell its list and clear up some of the obscurities concerning its less common species. More extensive notes upon habit and habitat of these will perhaps not be unwelcome, as bearing, in some slight degree, upon problems of distribution and environment. The species differ, of course, with altitude, and on lower slopes with direction of exposure.

It is possible to distinguish, roughly, three vegetative belts: lower altitudes, from base to perhaps 2200 feet, middle altitudes, from 2200 to 2800, and higher altitudes, from 2800 to 3500 feet, the summit. For the areas that my collections cover, the mountain slopes westwardly into New Ashford, west and northwest into Williamstown, north and northeast into North Adams. A large gorge in Williamstown very near the New Ashford line is known as Goodell Hollow. Farther north in Williamstown an immense, very deep, and composite gorge is not unfittingly termed the Hopper. The configuration of this last feature becomes noticeable even near the summit of the mountain, and, as might be expected, the species of northern range are to be sought here. My exertions of the past summer were largely confined to these gorges and the summit region. Results, as will be seen, were most noticeable in the genera Amblystegium and Hypnum, while the sphagna proved more diversified and interesting than I had anticipated.

The nomenclature used is again, as far as possible, that of the Manuals. In Amblystegium the monograph of Prof. Cheney in Botanical Gazette (XXIV, 236, ff.) has been consulted. Comparison has also been made in many cases with the figures in Sullivant's Icones, in Braithwaite's British Moss-flora, etc. The species follow:

MUSCI.

Amblystegium adnatum, (Hedw.) Aust. On rock in woods, lower slopes of Hopper. The species, which is not uncommon in the vicinity, has a distinct preference for limestone.

Amblystegium chrysophyllum, (Brid.) De Not. (*Hypnum chrysophyl-*

lum, Brid.). Moist ground about base of mountain in New Ashford and Williamstown.

Amblystegium compactum, (C. M.) Aust. Decayed spot in tree, Hopper. This is a species of northern range, occurring in New Brunswick, Ontario, British Columbia, and the Rocky Mountain region. Cheney also records it from New York, Pennsylvania, and Wisconsin. It has not before been reported from New England. It is readily distinguished by its serrate leaves and nearly erect capsule, running down into a narrow collum. I first found it about a large knot hole on a maple tree in the very centre of Williamstown village, where it was associated with *Leskea polycarpa*, Ehrh. and *Anacamptodon splachnoides*, (Froehl.) Brid., both uncommon species, the latter particularly so.

Amblystegium hispidulum, (Brid.) Grout. (*Hypnum hispidulum*, Brid.) About base of trees in woods. Lower slopes, New Ashford.

Amblystegium irriguum, (Wils.) Br. & Sch. Stones and ground about brooks. Lower altitudes in Williamstown and North Adams.

Amblystegium serpens, (Hedw.) Br. & Sch. Moist ground, lower slopes in Goodell Hollow. Not common.

Anomodon rostratus, (Hedw.) Sch. Moist rocks, near base in New Ashford.

Buxbaumia indusiata, Brid. I am indebted to Dr. G. N. Best for the identification of this specimen, as also for information with regard to its occurrence in New England. The only reference to such occurrence is a statement in Jaeger's Adumbratio to the effect that it was collected in the White Mountains by Oakes and distributed, mixed with *B. aphylla*, L. by Sullivant. Since it became known to American bryologists in 1890, it has been found in Idaho, Washington, and in the Catskill and Adirondack regions and about Ithaca, New York, but not hitherto in New England. It is generally a native of mountain regions and even where found is less abundant than the commoner *B. aphylla*. I was unable to find more than the one specimen, which was growing from a decayed spruce log at middle altitude.

Climacium Americanum, Brid. Damp ground in Hopper. Leaves from different parts of the same plant showed very different areolation, it being in some cases typical, in others very short, approaching that of var. *Kindbergii*, R. & C., though the plants were all dendroid.

Cylindrothecium cladorhizans, (Hedw.) Sch. Decayed stump near base of mountain in New Ashford.

Cylindrothecium seductrix, (Hedw.) Sull. About rocks on "Bluffs," middle altitude.

Dicranum flagellare, Hedw. On decayed wood at lower altitudes. Goodell Hollow.

Dicranum fulvum, Hook. Rocks in woods. Middle and lower altitudes in Hopper.

Dicranum scoparium pallidum, L. & J. On ground, lower slopes, Goodell Hollow. This variety, as it occurs here, is generally found in drier, more open places than typical *D. scoparium*.

Dicranum scoparium. A form or variety quite distinct, with long, robust stems, long, acuminate leaves, and very long capsules, sulcate when dry. On wet ground in deep woods, lower slopes, Goodell Hollow. Dr. True recognizes the form as one which he finds in the White Mountains under similar conditions.

Ditrichum vaginans, (Sull.) Hpe. Dr. Best kindly identified this species, which had considerably puzzled me. It occurs beside the carriage road, near the summit, where it is frequently mixed with *Pogonatum capillare*. Dr. Grout, I notice, in his Mosses with a Hand-lens, treats it as a plant of southern range in New England. Its occurrence at such an altitude, mixed with a plant of such northern range as *P. capillare*, would suggest the probability that it follows its congener, *D. tortile*. As bearing upon the contention of Austin and Lesquereux about the peristome, it may be interesting to note that the teeth of these specimens were decidedly papillose, supporting Austin's minority view. Limpricht in Die Laubmoose states that they are sometimes slightly papillose.

Eurhynchium strigosum, (Hoffm.) Br. & Sch. On ground and stones about brooks at various altitudes. Infrequent or not commonly fruiting.

Fissidens taxifolius, (L.) Hedw. On wet ground near the base, in New Ashford.

Grimmia apocarpa, (L.) Hedw. On rocks in brooks, Goodell Hollow, and wet rock in woods, Hopper.

Hylocomium umbratum, (Ehrh.) Br. & Sch. Thickly carpeting rocks and earth, near summit. Sparingly fruited.

Hypnum cupressiforme, L. Generally on bark of trees or logs. Lower altitudes, Goodell Hollow.

Hypnum curvifolium, Hedw. On wet rocks which receive a wash of decayed vegetable matter. Base of mountain in Goodell Hollow.

Hypnum dilatatum, Wils. On rocks in brook, middle altitude. Unfruited.

Hypnum eugyrium, Sch. On rock by brook, lower altitude, Goodell Hollow.

Hypnum Haldanianum, Grev. Earth, decaying vegetable matter, etc. Middle and mostly higher altitudes.

Hypnum imponens, Hedw. Decaying logs, generally in lower altitudes. Nowhere in great abundance.

Hypnum reptile, Rich. (*H. pallescens*, (Hedw.) Beauv.) Very abundant at all altitudes, on bark of trees, decaying logs, stumps, etc. More robust and pale in color toward summit.

Plagiothecium silvaticum, (Huds.) Br. & Sch. On ground and decaying wood at lower altitudes, in Goodell Hollow. Of the three Plagiotheciums occurring on the mountain, this species seems to prefer lower altitudes, *P. turfaceum* middle and *P. denticulatum* generally the higher. There is a noticeable difference in the time of ripening of capsule, the order being that of the length of the operculum, beginning with the shortest: *P. turfaceum*, *P. denticulatum*, *P. silvaticum*.

Pogonatum capillare, (Rich.) Brid. Mrs. A. M. Smith has called attention to the presence of this species (RHODORA, April, 1902). In New England it is a species of the highest alpine mountain summits, adding one more to the very limited alpine flora of Greylock.

Racomitrium Sudeticum, (Funck.) Br. & Sch. Mr. J. M. Holzinger kindly determined this species, which was unfruited. It grew upon the horizontal surface of a rock, near the summit, only the one small tuft being seen. The leaves are unusual in mostly lacking a hyaline point. It is another species of northern or high mountain range, and is probably new to Massachusetts, though occurring in the high mountains of the northern New England States.

Raphidostegium recurvans, (Schwaegr.) Jaeg. Very abundant about bases of trees and on decaying wood, at middle and higher altitudes. When sterile simulating the Hypnums.

Rhyncostegium rusciforme, (Weis) Br. & Sch. On rocks in brooks, at various, especially middle, altitudes.

Sphagnum cuspidatum, Ehrh. In wet spot near summit.

Sphagnum medium, Limpr. Low-growing, purplish form in similar places.

Sphagnum recurvum, Beauv. (*S. intermedium*, Hoffm. of Manual.) In similar situations.

Sphagnum rigidum, Sch. In similar situations.

Sphagnum tenerum, (Aust.) Warnst. In similar, more open place.

Distinguished from the closely-related *S. acutifolium* by the invo-lute-pointed stem leaves, fibrillose throughout, with divided utricles, and the narrow pores of the backs of leaves. Hitherto reported only from New Jersey and Connecticut.

Thuidium scitum, (Beauv.) Aust. Stones and base of trees in woods, near base in New Ashford.

HEPATICAE.

Aneura latifrons, Lindb. On decayed logs at middle altitude.

Cephalozia curvifolia, Dumort. Rather common on decayed wood at various altitudes. Most abundant and well-fruited at middle altitude with last.

Cephalozia divaricata, Dumort. This species was found in clefts of dry rock at base of mountain, in Hopper.

Cephalozia multiflora, Spruce. On decayed wood at various altitudes. Especially common about the summit, where it occurs mixed with other hepatics and mosses, and generally sterile.

Frullania aeolotis, Nees. (*F. riparia*, Hpe.) Bark of tree in Hopper, also on rock in woods of lower slope.

Jungermannia incisa, Schrad. On ground near summit.

Jungermannia Schraderi, Martius. On decayed logs at middle altitudes, with *Cephalozia curvifolia*.

Jungermannia ventricosa, Dicks. With *Dicranum fuscescens* on decayed stumps, just below the summit. The masses of minute bodies borne on the tips of the leaves gave the mat of plants a quite characteristic glaucous-green appearance.

Marsupella emarginata, Dumort. On wet rocks, frequently in brook-beds, at higher altitudes.

Radula complanata, Dumort. On rocks and earth at base of mountain in New Ashford, Williamstown, and North Adams.

Scapania nemorosa, Dumort. On ground and rocks at upper altitudes. The more or less erect plants generally bear dark gemmae at the apex.

Trichocolea tomentella, Dumort. About base of tree in very wet woods, middle altitude.

All of the above mentioned species are represented by herbarium specimens, which are at present with the Herbarium of Williams College in Williamstown.

CAMBRIDGE, MASSACHUSETTS.

REMARKABLE PERSISTENCE OF THE BUTTON-BUSH.

WALTER DEANE.

IT seems a strange and anomalous condition of things, a perversion of the laws that govern the distribution of plants, to see our common Button-bush (*Cephalanthus occidentalis*, L.) growing in a dry hen-yard behind a barn. Yet such is the case and the shrubs flourish from year to year in this quaint spot, though their natural habitat is swamps and the wet borders of ponds and streams. The story is an interesting one and illustrates well the dogged persistence that some plants show in the hard struggle for life.

The scene is in Shelburne, New Hampshire, on the farm of Mr. A. E. Philbrook. On one part of this farm, as early as 1860, there stood a small pond on whose borders grew in greater or less abundance the Button-bush. The water was shallow and muddy, and in summer the pond was reduced to a very swampy piece of land. Between 1860 and 1865, the owner of the land, in order to make a suitable site for a barn, decided to fill up the pond. To lighten this task a small neighboring stream was turned so as to flow along the foot of a sandy hill close by the pond. The water undermining the bank brought down a good supply of sand, and the pond was finally filled, the level of the ground being about three feet above the former surface of the water. The Button-bush was buried out of sight, for whatever may have been above ground was cut off or trampled down, and on this new land the barn was built and an area left in the rear was used as a wood-yard. Soon sprouts of the buried plants began to appear, but they were continually cut off or trodden under foot until finally the place was turned into a hen-yard and fenced in. Not long after this, the sprouts again appeared and ere long the plants were of normal size, in good condition, and flowering and fruiting regularly, though the roots were buried at least three feet deeper

than when the plants grew beside the pond. The place has been fenced in ever since and used either for hens or pigs or both, and yet through all this time to the present day the plants have continued to thrive.

I first saw this Button-bush on the Philbrook Farm in the summer of 1882. It was growing in a thick clump, some four feet high, the bushes were in full flower and the hens sought shelter from the hot sun under the shady branches. The next time I saw the plants was in October of the present year, fifteen years since my last visit. On repairing to the spot I found the conditions in no wise changed. The little yard was still there, fenced in as formerly. Fifteen little pigs and some hens were roaming about the enclosure. There on one side within a space thirty-three by twenty-eight feet in extent grew the Button-bush. I counted as many as seventy stems rising above the ground which was dry and hard as formerly, and packed closely about the plants by the many feet of the strange companions of these water-loving shrubs. They were from three to seven and one half feet in height, and were setting a good crop of fruit. Mr. Philbrook who has kindly given me the early history of this plant says that the roots are at least six feet below the surface of the ground, but that at that depth the soil is always wet in this particular locality. In this respect only does the plant in any degree follow the normal habit of the species. The shoots of the Button-bush are not so numerous as they were a few years ago, but this is due to the fact that they receive pretty hard treatment from the pigs that root about the stems and rub continually against them. The hens also pick at the young shoots within reach. Still for thirty-seven years under these unnatural conditions have the plants flourished and, if unmolested, there seems to be no reason for putting any limit to their vitality.

Cambridge, Massachusetts.

A CRISTATE FORM OF NEPHRODIUM MARGINALE.

F. G. Floyd.

Very few of our New England ferns have been found crested. Perhaps this is partially accounted for by the fact that this phase of abnormal growth is a branch of fern study that has not, until quite recently, interested American collectors. That these cristate varie-

ties are not so rare with us as is usually supposed but are simply overlooked I have been led to believe by my observations on bifid and trifid fronds. This latter form of development is quite frequent although not generally considered so. Where I find a species in abundance it is seldom that a careful search fails to disclose at least one frond of this character.

I was on just such a search among *Polypodium vulgare* when my attention was arrested by a peculiar plant of *Nephrodium marginale*, Richard and on closer inspection I found every frond was crested. Evidently the plant was quite young for the fronds were few and of medium size and the crown was small. I was unable, after a careful examination, to detect anything in the environment of the plant that would account for its assuming this peculiarity. It grows, surrounded by its fellows, apparently under similar conditions.

When the plant was discovered the season of 1901 was well advanced, but several of the fronds of previous years persisted about the base showing unmistakably that they were cristate. The station was again visited this year (1902) and another crop of similar fronds found. As the variation appears to be permanent it seems advisable to give the fern formal recognition and I take pleasure in naming it in honor of our well-known pteridologist, Mr. George Edward Davenport.

NEPHRODIUM MARGINALE, Richard, forma **Davenportii.** Fronds similar to those of the species in outline and lobation. The apex and tips of lower pinnae bearing tassel-like enlargements produced by the dividing of the rachis into two or more parts; these being again parted and these segments once or twice cleft, thus forming a series of short, overlapping, crowded and somewhat spreading parts.

The plant was found in Milton, Massachusetts, in an unfrequented part of the Blue Hills Reservation. Specimens are deposited in the Herbarium of the New England Botanical Club, the herbarium of Geo. E. Davenport and in my own herbarium.

WEST ROXBURY, MASSACHUSETTS.

RARE PLANTS IN CENTREVILLE, MASSACHUSETTS.

CLARA IMOGENE CHENEY.

VERBENA HASTATA, forma **rosea.** Habit, stature, foliage, etc., as in the typical form; corolla bright rose-colored.—Centreville, Massachusetts.

On August 18th, 1902, I found this Verbena with bright pink flowers instead of the common blue or rarer white ones. The plants were growing in mud on the margin of a lily pool and in the closest proximity to the typical *Verbena hastata*, L., which they strongly resemble. After a most careful examination and comparison of the two forms, no difference was detected excepting in color. The inflorescence, manner of growth, form and texture of the leaves were all alike. I counted sixteen plants of the roseate-flowered form growing in a small space.

CALAMINTHA ACINOS, L. During the summer of 1900 my attention for the first time was attracted to *Calamintha Acinos*, L., which at Centreville has come under my close observation in each succeeding year. The plant has previously been known in New England only from southern Vermont and northwestern Massachusetts. It grows at Centreville in small patches in a dry, sandy soil, with no shade whatever. In close companionship with *Calamintha Acinos* is found *Calamintha Clinopodium*, Benth., from season to season, but less abundantly. According to Gray's Manual of Botany, the latter plant is indigenous from the Great Lakes to the Rocky Mountains. Both of these plants flower in July.

VACCINIUM STAMINEUM, L. This shrub was formerly known in New England only from Berkshire County and the mountains of Hampshire County, Massachusetts, and from Connecticut, but three years ago I found at Centreville a half dozen of these shrubs growing close together in an open, dry, sandy field, on both sides of a cart-road leading to a pond near by. The most vigorous of these was from three to four feet in height, in form compact and most symmetrical. The shrub flowers the last of May or early in June. There seems to be no "off year" for fruit, for the branches yield berries in great abundance each successive season.

Specimens of these plants from Cape Cod have been submitted to the staff of the Herbarium of Harvard University and I am much indebted to Dr. B. L. Robinson and Mr. M. L. Fernald for valuable assistance in the identification.

BOSTON, MASSACHUSETTS.

NOTES ON SOME FERNS OF FRANKLIN COUNTY, MAINE.

H. W. Jewell.

Mt. Day in the towns of Temple and Strong has long been a popular resort for local botanists, but Woods Hill, near Mt. Day and only about half as high, has been less known. On a trip to Woods Hill early in October many ferns were found, among others the following which are of special interest:

Adiantum pedatum, L. Quite plentiful.

Aspidium aculeatum, Swartz, var. *Braunii*, Koch. Three sterile plants were found on Woods Hill; but on the east base of Mt. Day a station of more than forty large finely fruited plants was seen. This is a fine fern with a very distinguished appearance, and I am not aware that it has been previously found in western Maine.

Aspidium Goldianum, Hook. A large station of finely fruited specimens near a brook. The only stations previously known in the state are in the Kennebec Valley.

Cystopteris bulbifera, Bernh. A large station on rocks and on the ground along a brook.

Cystopteris fragilis, Bernh. Only a few poorly fruited plants.

Woodsia Ilvensis, R. Br. Mt. Day.

Aspidium spinulosum, var. *dilatatum* and var. *intermedium* on Mt. Day.

Polypodium vulgare, var. *auritum*, Willd. Since reading in Rhodora for October of Miss Shaw's station for *Polypodium vulgare*, var. *cambricum* I have sent to the Gray Herbarium specimens of a Polypodium which grows in three stations on ledges at Farmington, and I am told that the plant is *P. vulgare*, var. *auritum*, which has been known in America only from Essex County, Massachusetts. The fronds are very thin, the margins of most of the pinnae are crenate or undulate, and the lowest pinnae often have next the rachis an elongated lobe.

Farmington Maine.

Cuphea procumbens at Andover, Massachusetts. — On the 22nd of September, 1901, I found a plant of *Cuphea* growing at Andover and made a pressed specimen of it. I found the plant in a

rather high, wet pasture, and though I searched the place carefully, could not find another. A part of the specimen was sent to Mr. John Robinson of Salem. It was forwarded later to the Gray Herbarium, where it was determined as *Cuphea procumbens*, Cav., a species of southern Mexico. I am told that the only record of this species from any part of the United States is a note by Dr. J. K. Small in the Bulletin of the Torrey Botanical Club, xxiii. 295 (1896), where it is stated that *Cuphea procumbens* had been collected as a garden escape in Macon County, Georgia, by Mr. A. M. Huger. It is difficult to account for the occurrence of the species in Andover, but the fact of its presence here seems worthy of record. — M. E. Gutterson, Andover, Massachusetts.

Erodium moschatum in Connecticut. — On September 28th the writer found in Hartford some specimens of an unfamiliar plant. Three were gathered and taken home for identification. They proved to be *Erodium moschatum*, L' Her., a species which appears not to have been reported from Connecticut before. The spot was revisited a week later and two more specimens of the *Erodium* were found and still another was discovered at a distance of several rods, thus making six plants in all. Of these, five were found by the side of an old warehouse that has been used for many years for storing paper stock. It is near the railroad and steamboat landing. The soil in which the plants grew is a mixture of ashes, cinders, and such other stuff as would be likely to collect in such a place. The last and smallest plant was rooted in a lump of old cotton that had been trodden down into the ground. From the Gray Herbarium I am informed that *Erodium moschatum* has been found in New England at the following stations: In wool-waste at North Berwick, Maine, by Mr. J. C. Parlin; on waste land in South Boston, Massachusetts, by Messrs. E. and C. E. Faxon; also reported from Lowell, Westford, and Chelmsford, Massachusetts (see Dame & Collins, Flora of Middlesex County), and at Concord, Massachusetts (see Hosmer in Rhodora, i. 223). At all these points the plant has been found on or near mill or warehouse refuse. The species is a native of the Old World but is extensively naturalized on our Pacific coast, whence it has been probably brought to New England in western wool. — H. S. Clark, Hartford, Connecticut.

AN AMERICAN OCCURRENCE OF THE EUROPEAN CENTAUREA DIFFUSA.— As I was riding about a half mile west of the little village of Norfolk, Massachusetts, on July 7th, 1902, in search of *Polygala polygama* and the hoary pea, which grow beside the road in that locality I noticed two peculiar plants. They grew close together near the wheel track on a dry hillside, and were, I think, over a foot tall. I picked two small specimens, but revisited the plants some weeks later and secured larger specimens. On one of these, when kept in water, a white flower came out. A pressed specimen in flower bud was sent to the Gray Herbarium, where it was identified as *Centaurea diffusa*, Lam., a native of the Old World, ranging from Austro-Hungary to Asia Minor. How did these plants reach here? — R. L. MANN, Walpole, Massachusetts.

TWO NEW STATIONS FOR ARCEUTHOBIUM.— On October 18 of this year, while passing through a spruce swamp in the northeastern part of Wilmington, Massachusetts, I noticed several spruces covered with 'witches' brooms.' I at once thought of *Arceuthobium pusillum*, Peck, and an examination of some of the trees disclosed abundant plants of this interesting parasite. One week later (October 25) on spruces around a little pond in the southeastern part of Andover, about four miles from the Wilmington locality, I found other spruces with 'witches brooms' and *Arceuthobium*. Except for the station reported by Mr. Jack in RHODORA, ii. 6, and now, as I understand, destroyed by the new Metropolitan Reservoir, this species seems not to have been hitherto reported from Massachusetts. — ARTHUR STANLEY PEASE, Andover, Massachusetts.

NEWLY INTRODUCED SPECIES OF CREPIS AND LEONTODON. — As compared with the wide distribution and large number of species of Crepis and Leontodon growing throughout Europe but few species are reported to have found their way to North America. Four species of Crepis and three of Leontodon comprise the list and of the seven *L. autumnalis*, L. is the only one at all common. In June last the following species of these genera were found growing at Southington, Connecticut, in a small plot of grass land of not over an acre in extent. It is natural to suppose that these plants were introduced

with grass seed when the land was last ploughed and reseeded Owing to the death of the owner it is impossible to say exactly how long the land has been in turf but it is at least eight years and probably longer since the land was under plough. So far as I have been able to ascertain not one of these three species has before been reported as growing this side of the Atlantic. The occurrence of the three at one station is interesting. Apparently the plants have maintained themselves for at least eight years. They have little opportunity to spread from seed however as the field is mown at too early a date to allow seed to ripen, thus it is probable that whenever the field is again ploughed the plants will disappear.

Crepis taraxacifolia, Thuill. (Growing throughout Europe.) Of this species about twenty plants were found, the plants growing one in a place.

Crepis rigida, W. &. K. (Growing in Eastern and Northern Europe and Western Asia.) Only one plant of this species was found.

Leontodon hastilis, L. (Growing throughout Europe and the Orient.) One colony of this species was found comprising ten or a dozen individuals.— C. H. BISSELL, Southington, Connecticut.

ERRATA.

Page 49, line 15; for *junceus* read *juncea*.
" 53, " 32; " Native *read* Nature.
" 65, " 3; " ROBNISON read ROBINSON.
" 76, " 33; " *Chrysoplenium* read *Chrysosplenium*.

July Number, first page of cover, line 16, for **aurantiacum** read **praealtum**.

Page 158, line 19; for Medical *read* Médical.
" 158, " 21; " la *read* ce.
" 158, " 23; " Médicine *read* Médecine.
" 158, " 29; " le *read* la.
" 200, " 22; " Island *read* Swamp.
" 215, " 20; " branches-prostrate *read* branches prostrate.
" 222, " 15; " scirpoides *read* scirpoidea.
" 228, " 29; " *chordorhiza* read *chordorrhiza*.

Vol. 4, no. 47, containing pages 207 to 230 was issued 19 November, 1902.

INDEX TO VOLUME 4.

Names of new plants are printed in full face type.

Abies balsamea, 24, 84, 189.
Acer dasycarpum, 130; Negundo, 130; saccharinum, 130.
Acerates viridiflora, 17.
Acolea coralloides, 207.
Acrosiphonia, 112, 115.
Actaea, 88; alba, 75.
Adder's Tongue, 88.
Additions to the Flora of Massachusetts, Some, 166.
Adiantum pedatum, 247.
Adpressum Group, Two New Hypericums of the, 135.
Aegagropila, 113, 115.
Agarics, Pink-spored, 6.
Agaricus campestris, 77, 79, 199.
Agrimonia gryposepala, 91; parviflora, 85; striata, 91.
Agrostis, 49; alba, 33; arachnoidea, 143; brevifolia, 46, 47; coarctata, 26; intermedia, 39, 90; juncea, 48, 49; perennans, 90; rubicunda, 143; trichopodes, 143.
Aira artica, 143; brevifolia, 143, 144; media, 144.
Ajuga reptans, 14.
Alder, 74, 168.
Algae, 111, 118, 124.
Algologist's Vacation in Eastern Maine, 174.
Alnus viridis, 189.
Amanita, 5, 6, 78; caesarea, 5; muscaria, 78.
Amanitopsis, 5, 6; vaginata, 78.
Amblystegium, 238, 239; adnatum, 238; chrysophyllum, 238; compactum, 239; hispidulum, 239; irriguum, 182, 239; Lescurii, 182; serpens, 239; subtile, 181.
America, An Osmorrhiza New to Eastern, 153; Early Records of Leontodon in, 39; Taraxacum palustre in, 155; Variations of Glaux in, 213.
American Cranberries, Variations and Distribution of, 231; Horticulture, Cyclopedia of, 108; Occurrence of the European Centaurea diffusa, 249; Variety of Vaccinium Vitis-Idaea, 231.
Ammidown, L. E., Saleratus as a Protection against Rhus-poisoning, 105.
Ammophila, 33.
Amphicarpa Pitcheri, 91.
Anacamptodon splachnoides, 239.
Anadema, 115.
Anagallis arvensis, 16, 185, 186, and caerulea in Vermont, 185; caerulea 185, 186.
Andover, Massachusetts, Cuphea procumbens at, 247; Hieracium praealtum at, 197.
Andrews, A. L., List of Bryophytes from the Mt. Greylock Region, 29; Bryophytes of the Mt. Greylock Region,—II, 238; Note upon Recent Treatment of Habenaria hyperborea and its Allies, 79.
Andrews, L., Gleditschia triacanthos established in Connecticut, 103; Notice of work, 202.
Andromeda ligustrina, 131.
Anemone, 88; quinquefolia, 88; virginiana, 74.
Anemonella thalictroides, 63, 76.
Aneura latifrons, 242.
Annual Meeting of the Josselyn Society, 188; Winter Meeting of the Vermont Botanical Club, Seventh, 64.
Anomalous Fern, 10; Skullcap, 137.
Anomodon apiculatus, 30; attenuatus, 30; rostratus, 239.
Antennaria canadensis, 85, 92; neodioica, 92; Parlinii, 152, Staminate Plant of, 152; plantaginea, var. petiolata, 92.
Anthelia julacea, 213; Juratzkana, 212, 213.
Antithamnion boreale, 177; Pylaisaei, 177.
Apargia autumnalis, 39.
Aphyllon uniflorum, 76.
Aplectrum hiemale, 18, 20, 22.
Apocynaceae, 17.
Apocynum, 20; androsaemifolium, 17, 81; cannabinum, 17, 81; medium, 137.
Aquilegia canadensis, var. flaviflora, 169, in Maine, 169, var. Phippenii, 169.

Arabis confinis, 85; perfoliata, 93.
Aralia racemosa, 75.
Arbutus, 127, 128; Trailing, 140.
Arceuthobium, 249; pusillum, 28, 35, 249; Two New Stations for, 249.
Arctostaphylos, 34.
Arenaria peploides, 189.
Arethusa bulbosa, 18, 76.
Armillaria, 77; mellea, 77.
Arum, 168.
Asclepiadaceae, 17.
Asclepias Cornuti, 17; incarnata, 17, var. pulchra, 17; obtusifolia, 17, 19; phytolaccoides, 17; purpurascens, 17; quadrifolia, 17, 19, 74; syriaca, 17; tuberosa, 17, 19; verticillata, 17, 19.
Ash, Prickly, 130.
Aspideae, 9; New England, 7.
Aspidium, 7–9, 51, 52, 53, 160, 164, 166; aculeatum, var. Braunii, 247; Braunii, 10; Goldianum, 247; Lonchitis, 8; Plumieri, 160; spinulosum, var. dilatatum, 247, var. intermedium, 247; trifoliatum, 8, 160.
Asplenium, 165; acrostichoides, 39; ebenoides, 54; ebeneum, 54, var. Hortonae, 54; Filix-foemina, 7; montanum, 54, 157; Ruta-muraria, 55; Trichomanes, 54; viride, 54.
Asprella Hystrix, 89.
Aster, 89, 186; cordifolius, 88; ianthinus, 203; macrophyllus, var. ianthinus, 203; Novae-Angliae, 89; Novi-Belgii, 92, 186; salicifolius, 89, 94; tardiflorus, 100; undulatus, 186; **undulatus × Novi-Belgii**, 186, 187.
Athyrium, 8, 160; Filix-foemina, 160.
Atrichum angustatum, 30; undulatum, 30.
Atriplex patulum, 92.
Aulacomnium heterostichum, 30, 169, in Maine, 169.
Avena striata, 99.
Avicularia, 65, 66; New England Polygonums of the Section, 65.
Azalea, 141; viscosa, 106.

Bachbunge, 191.
Bacon, A. E., Anagallis arvensis and caerulea in Vermont, 185; Cases of Poisoning by Cypripedium spectabile in Vermont, 94; Dwarf Mistletoe at Bradford, Vermont, 28.
Bailey, L. H., Notice of work, 108.
Bailey, W. W., Some Notable Plant Stations in Rhode Island, 198.
Barbarea vulgaris, 92.
Barbula unguiculata, 30.
Bartramia pomiformis, 30.
Bazzania trilobata, 30.
Beaked Hazel, 132.
Beal, W. J., Seed-throwing of Viola, 230.
Beccabunga, 191.
Beech, 93, 169; Blue, 132.
Betula lenta, 83; papyrifera, 90; pendula, var. dalecarlica, 83; populifolia, 132.
Bidens vulgata, 100.
Bigelow, E. G., Notice of work, 40.
Biological Relation of Polygonum Hartwrightii to P. amphibium, 104.
Birch, 74, 141; A Cut-leaved Cherry, 83; Cherry, 83; Gray, 132; White, 83.
Bird Club, The Vermont, 138.
Bird's Knotgrass, 65.
Bissell, C. H., Biological Relation of Polygonum Hartwrightii and P. amphibium, 104; Newly Introduced Species of Crepis and Leontodon, 249; Notice of work, 202; Rediscovery of Phaseolus perennis in New England, 13; Some Noteworthy Plants of Connecticut, 98.
Bitter Boletus, A Form of, 187.
Black Chokeberry, 55, 56; Huckleberry, 14; Oak, 132, Scrub, 133; Spruce, 35.
Blackberry, 40.
Bladder-nut, 130.
Blanchard, W. H., Elusive Character of Pogonia pendula, 2; Our Chokeberries, 55; Some Vermont and New Hampshire Plants in the Middle Connecticut Valley, — I, 129.
Blasia pusilla, 30.
Blepharostoma trchophyllum, 30.
Blomberg, C., Some Plants recently found in and around North Easton, Massachusetts, 13; Utricularia minor in Vinnicunnet, Massachusetts, 102.
Bloodroot, 128.
Blooming of Hepaticas, 127.
Blue Beech, 132; Hills Reservation, A Few Plants of the, 74.
Blue-berried Huckleberry, Notes on the, 14.
Blueberry, 14; Half-high, 131.
Blue-black Huckleberry, 14.
Boleti, 172.
Boletus, 78; A Form of the Bitter, 187; felleus, 187, 188, var. obesus, 187.
Botanical Club, The Vermont, 138, Seventh Annual Winter Meeting of, 64; Society of Maine, Josselyn, 110, 188, Mid-winter Meeting, 62.
Botany, Outlines of, 85.
Botrychium, 159; lanceolatum, 36; matricariaefolium, 36; ternatum, 55.

Botrypus, 159.
Box Elder, 130.
Brachythecium glaciale, 182; reflexum, 30, 182; salebrosum, 30; Starkei, 30.
Bradford, Vermont, Dwarf Mistletoe at, 28.
Brainerd, E., Two More Rare Plants from Lake St. John, Quebec, 128.
Brasenia peltata, 76.
Brassica campestris, 92; juncea, 92; Sinapistrum, 92.
Broklempe, 191.
Broklympe, 191.
Bromus **brachyphyllus**, 146; laevipes, 147; secalinus, 90.
Brooklime, 81, 191, 192.
Brooks, H., Notice of work, 40.
Brunswick, Maine, Occurrence of Eleocharis diandra at, 1.
Bryhnia graminicolor, 183.
Bryophytes, 29; from the Mt. Greylock Region, List of, 29; of the Mt. Greylock Region, — II, 238.
Bryum affine, 181; argenteum, 30; bimum, 30; caespiticium, 30; pseudotriquetrum, 181; roseum, 30.
Buffalo Bur, 151.
Bulrush, Giant, 102.
Bur, Buffalo, 151.
Buttercup, 32.
Button bush, 131, 243, 244; Remarkable Persistence of, 243.
Buttonwood, 132.
Buxbaumia aphylla, 239; indusiata, 239.

Calamintha Acinos, 246; Clinopodium, 246.
Calla palustris, 74, 106.
Callitriche Austini, 99.
Calluna vulgaris, 200; in Southern New Hampshire, 200.
Calopogon pulchellus, 18.
Calothrix pulvinata, 178.
Calypso borealis, 18, 22.
Campanula aparinoides, 15; glomerata, 15, 20; rapunculoides, 17; rotundifolia, 15, var. arctica, 19.
Campanulaceae, 15.
Camptosorus, 63; rhizophyllus, 55, 63.
Cardamine hirsuta, var. sylvatica, 92; pennsylvanica, 92.
Carduus discolor, 203.
Carex, 167; acutiformis, 218; adusta, 218; aenea, 218, 227; aestivalis, 218, 227; alata, 218; albicans, 218, 223, 224; albolutescens, 218, 227; alopecoidea, 218; alpina, 228; aperta, 226; aquatilis, 218, var. elatior, 218; arcta, 218; arctata, 218, var. Faxoni, 218, × castanea, 218; atrata, var. ovata, 218; atlantica, 229; aurea, 168, 218, in Connecticut, 168; Backii, 218, Bebbii, 218, 228; Bicknellii, 219, 228; bromoides, 219; brunnescens, 219; bullata, 219, var. Olneyi, 219; canescens, 219, 228, var. disjuncta, 219, var. subloliacea, 219; capillaris, 219, var. elongata, 219, 228; capitata, 150, 219, 228; Careyana, 227; castanea, 219, 228; cephaloidea, 219; cephalophora, 219; chordorrhiza, 219, 228; concinna, 228; conoidea, 219; Crawei, 219, 227, 228; Crawfordii, 219, var. vigens, 219; crinita, 219, var. gynandra, 219, var. minor, 219, var. simulans, 219, × torta, 219; cristata, 219; Davisii, 219; debilis, var. Rudgei, 219, var. strictior, 219, × virescens, 219; deflexa, 219, var. Deanei, 219; Deweyana, 219; digitalis, 219; divulsa, 225; eburnea, 219, 228; echinata, 222, 225, var. cephalantha, 222, var. ormantha, 222; elachycarpa, 227; Emmonsii, 223, var. elliptica, 223, 224; exilis, 219, 229; festucacea, 219, var. brevior, 219; filiformis, 219, 224, var. latifolia, 219; flava, 219, 224, var. Oederi, 219, 224; foenea, 219, var. perplexa, 219; folliculata, 219; formosa, 220; fulva, 227; fusca, 220; glaucodea, 60, 220; Goodenowii, 220, 224, 225; gracillima, 220; Grahami, 220; granularis, 220, var. Haleana, 220; Grayi, 220, 229; grisea, 220, var. angustifolia, 220; gynocrates, 220, 227, 229; Haydeni, 226; hirta, 220; Hitchcockiana, 220; Houghtonii, 220; hystricina, 220, var. Dudleyi, 220; interior, 220, var. capillacea, 220; intumescens, 37, 220, var. Fernaldii, 220; katahdinensis, 128, 220; laevigata, 227; laxiculmis, 220; laxiflora, 220, var. latifolia, 220, var. patulifolia, 220, var. striatula, 220, var. varians, 220; lenticularis, 220; leporina, 220, 229; leptalea, 220; limosa, 220, 224; littoralis, 99, 220; livida, 220; longirostris, 220; lupulina, 220, var. pedunculata, 220, var. polystachya, 220, × bullata, 220; lurida, 220, var. exudans, 220, var. flaccida, 220, var. gracilis, 220, 229, var. parvula, 220, × lupulina, 221; magellanica, 150, 221, 229; maritima, 221, var. erectiuscula, 221; Michauxiana, 221; mirabilis, 37, 221, var. perlonga, 90, 221, var. tincta, 221; Muhlenbergii, 221, var. enervis, 37,

39, 221; muricata, 221; nigro-marginata, 27, 221; norvegica, 221; Novae-Angliae, 221, 229; Oederi, 224; oligocarpa, 221; oligosperma, 221, 229; oronensis, 221; pallescens, 221; panicea, 221; pauciflora, 221; pedunculata, 84, 221, 229; pennsylvanica, 221, var. lucorum, 221; pilulifera, 221, var. longibracteata, 221; plantaginea, 221; platyphylla, 221; polymorpha, 221; 229; Porteri, 221; praecox, 221; prasina, 221; pratensis, 221, 224; praticola, 224; Pseudo-Cyperus, 221, var. americana, 221; ptychocarpa, 221; pubescens, 221; rariflora, 221; retrorsa, 221, var. Hartii, 221; **retrorsa × rostrata**, 221, × utriculata, 221; rigida, 224, 225, var. Bigelovii, 221, 225, var. Goodenovii, 224; riparia, 221; rosea, 221, var. minor, 222. var. radiata, 222, 227, var. retroflexa, 222; rostrata, 222, var. ambigens, 222, var. utriculata, 222; rotundata, 222; salina, var. cuspidata, 222; saxatilis, 222, var. miliaris, 222, var. rhomalea, 222; scabrata, 222, × crinita, 222; Schweinitzii, 222, 225; scirpoidea, 222, 229, 250; scoparia, 222, var. condensa, 222, var. moniliformis, 222; seorsa, 222; setacea, 222; Shortiana, 227; siccata, 222; silicea, 33, 222; sparganoides, 222; squarrosa, 222, 225; stellulata, 222, 225, var. angustata, 222, var. **cephalantha**, 222, var. **excelsior**, 222, var. **ormantha**, 222; sterilis, 222, 229, var. excelsior, 222; stipata, 222; straminea, 222; striata, 227, var. brevis, 222, 230; stricta, 222, 225, 226, var. angustata, 222, 226, var. curtissima, 222, 226, var. decora, 222, 226, × salina, 222, × torta, 222; styloflexa, 222; subulata, 223, 230; tenella, 223; tenera, 223, var. invisa, 223, var. Richii, 223; tenuiflora, 223, 226, 230; teretiuscula, 223, 230, var. ramosa, 167, 223; tetanica, 168, 223, var. Meadii, 223, 227, var. Woodii, 167, 223; torta, 223; tribuloides, 223, var. reducta, 223. var. turbata, 223; triceps, var. hirsuta, 223; trichocarpa, 223, 227, 230; trisperma, 223, 226; **trisperma × tenuiflora**, 223, 226; Tuckermani, 223; typhinoides, 223, 225; umbellata, 223, var. brevirostris, 223, var. tonsa, 223; vaginata, 223; varia, 223, 224, 227, var. colorata, 223; vesicaria, 223, var. distenta, 223, var. jejuna, 223, var. monile, 223; vestita, 223, 227, var. Kennedyi, 223; virescens, 223, var. costata, 223, × arctata, 223; vulgaris, 224; vulpinoidea, 223; Willdenovii, 223; xanthocarpa, 223, var. annectans, 223.

Cariceae, 227.

Carices at Sudbury, Massachusetts, Two Noteworthy, 167.

Carpinus caroliniana, 132.

Carval, 81.

Carvell, 81.

Carya alba, 132; amara, 132.

Cases of Poisoning by Cypripedium spectabile in Vermont, 94.

Cassia Chamaechrista, 37.

Castanea sativa, var. americana, 133.

Cat-tail Flag, 93.

Ceanothus americanus, 76, 130.

Cedar, Red, 133.

Celtis occidentalis, 132.

Centaurea diffusa, 249, American Occurrence of the European, 249; nigra, 189.

Centreville, Massachusetts, Rare Plants in, 245.

Cephalanthus, 182, occidentalis, 131, 243.

Cephalozia curvifolia, 242; divaricata, 242; multiflora, 242.

Ceramium rubrum, 177.

Cerastium arvense, var. fuegianum, 150.

Ceratodon purpureus, 30.

Certain Eaters of Mushrooms, 77.

Cesia coralloides, 207.

Chamaecyparis sphaeroidea, 106.

Chamberlain, E. B., Aulacomnium heterostichum in Maine, 169.

Character of Pogonia pendula, The Elusive, 2.

Cheney, C. I., Rare Plants in Centreville, Massachusetts, 245.

Cherry, 81; Birch, 83, Cut-leaved, 83; Sand, 130.

Chervil, 81.

Chestnut, 133.

Chilian Empetrum in New England, 147.

Chiloscyphus polyanthos, 30.

Chimaphila maculata, 75.

Chlorophyceae, 178.

Chokeberries, Our, 55.

Chokeberry, Black, 55, 56, Red, 55, 131.

Chorda Filum, 175; tomentosum, 175.

Christmas Fern, 10, 53.

Chrysosplenium, 250; americanum, 76.

Churchill, J. R., Some Plants from Prince Edward Island, 31.

Circaea intermedia, 137; Lutetiana, 89.

Cirsium altissimum, var. discolor, 203; horridulum, 93; palustre, 217, a Native of New Hampshire, Is, 217.

Cistaceae, 28.
Cladophora, 111, 112, 113, 115, 124, 125; albida, 114, 119, 120, 121, 125, 127, var. refracta, 119; arcta, 114, 115, 116, 117, 118, 127, var. centralis, 117; diffusa, 126; expansa, 114, 122, 123, 124, 127, 178, var. glomerata, 123; flavescens, 124; flexuosa, 114, 119, 121, 122, 125, 127, forma **densa**, 121; fracta, 114, 124, 127, forma **flavescens**, 124, forma marina, 124; gracilis, 114, 120, 121, 122, 123, 126, 127, forma **elongata**, 122, var. expansa, 122, var. tenuis, 122, 123, var. **vadorum**, 122; glaucescens, 114, 120, 121, 127; hamosa, var. refracta, 125; hirta, 114, 121, 122, 123, 126, 127; Hutchinsiae, 114, 126, 127, var. distans, 126; Hystrix, 114, 116, 117, 127; lanosa, 114, 118, 119, var. uncialis, 118; laetevirens, 114, 121, 122, 125, 127, var. glomerata, 126; Magdalenae, 114, 124; refracta, 114 119, 120, 124, 125, 127; Rudolphiana, 114, 120, 127; rupestris, 114, 125, 127; Sonderi, 116, 117; spinescens, 114, 116, 117, 118, 119, 127; uncialis, 118, utriculosa, var. laetevirens, 126.
Cladophoras of New England, The Marine, 111.
Clark, A., A Few Plants of the Blue Hills Reservation, 74.
Clark, A. G., Utricularia minor in Holbrook, Massachusetts, 42.
Clark, H. S., Erodium moschatum in Connecticut, 248.
Clathrus, 134; cancellatus, 135; columnatus, 134, 135, in Lawrence, Massachusetts, 134
Clethra, 108.
Cliff-Brake, Purple, 54.
Climacium americanum, 239, var. Kinbergii, 239.
Climbing Fern, 51; in New Hampshire, 83.
Clintonia borealis, 74, 76, 106.
Clitocybe, 7.
Club, Field Meeting of the Vermont Botanical, 189; The Vermont Bird, 138, The Vermont Botanical, 138.
Club Moss, 55.
Cnicus horridulus, 93; lanceolatus, 92.
Coast at Cutler, Maine, 23.
Collins, F. S., Algologist's Vacation in Eastern Maine, 174; Marine Cladophoras of New England, 111.
Collins, J. F., Distinctive Features of Iris Hookeri, 179; Extension of Range for the Typical Lycopodium complanatum, 154.
Collinsonia canadensis, 89.
Colpodium junceum, 48.
Coltsfoot, Sweet, 128.
Comandra livida, 18, 98, and Lycopodium sitchense on Mt. Washington, Discovery of, 97; umbellata, 18.
Compositae, 33.
Concerning the Plants mentioned in Young's Chronicles, 81.
Conferva, 112; albida, 119; arcta, 116; diffusa, 216; distans, 126; expansa, 123; flexuosa, 121; glaucescens, 120; gracilis, 121; Hutchinsiae, 126; laetevirens, 126; lanosa, 118; refracta, 119, 120, 125; Rudolphiana, 120; rupestris, 125; uncialis, 118; vadorum, 122.
Connecticut, Carex aurea in, 168; Erodium moschatum in, 248; Gleditschia triacanthos established in, 103; Notes on the Flora of, 36; Noteworthy Plants of, 84, of Southeastern, — III, 26; Some Noteworthy Plants of, 98; Valley, Some Vermont and New Hampshire Plants in the Middle, — I, 129.
Conocephalus conicus, 30.
Conopholis, 169; americana, 75, 76, 169, in Maine, New Stations for Peltandra virginica and, 168.
Coprinus atramentarius, 199; comatus, 199.
Corallorhiza innata, 18, 74; multiflora, 18, 75; odontorhiza, 18; striata, 22.
Coreopsis trichosperma, 76.
Cornus, 89; canadensis, 74, 75; circinata, 131; paniculata, 89, 131.
Corylus americana, 132; rostrata, 132.
Cotton-grass new to North America, 82.
Cotula coronopifolia, 32, 33.
Cowberry, 232.
Cow Lily, 93.
Cranberries, Variations and Distribution of American, 231.
Cranberry, High, 131; Large, 234; Mountain, 231, 232; Rock, 231; Small, 235.
Crataegus, 64; asperifolia, 166, 167; lobulata, 167; Pringlei, 167; scabrida, 166.
Crepis, 249; and Leontodon, Newly Introduced Species of, 249; rigida, 250; taraxacifolia, 250; virens, 197, in Eastern Massachusetts, 197.
Cress, Garden, 32; Water, 81.
Cristate Form of Nephrodium marginale, 244.
Crowberry, 34, 147.
Cryptotaenia, 88.
Cuphea, 247; procumbens, 248, at Andover, Massachusetts, 247: viscosissima, 106.

Cuscuta Gronovii, 92.
Cut-leaved Cherry Birch, 83.
Cutler, Maine Coast at, 23.
Cyanophyceae, 178.
Cyclopedia of American Horticulture, 108.
Cylindrothecium cladorhizans, 240; seductrix, 240.
Cyperaceae, 82, 225.
Cypripedium, 22, 95, 97; acaule, 18, 106; arietinum, 18, 20, 62, on Mt. Toby, Massachusetts, 62; parviflorum, 18, 21; pubescens, 18, 96; spectabile, 18, 95, 96, 97, in Vermont, Some Cases of Poisoning by, 94.
Cystopteris bulbifera, 247; fragilis, 150, 247.

Dactylis glomerata, 90.
Dame, L. L., Notice of work, 40.
Dandelion, 155; Fall, 39.
Davenport, G. E., Miscellaneous Notes on New England Ferns,— III, 7, IV, 49, V, 157.
Davis, C. A., Occurrence of Eleocharis diandra at Brunswick, Maine, 1.
Deane, W., Calluna vulgaris in Southern New Hampshire, 200; Cyclopedia of American Horticulture, 108; Remarkable Persistence of the Button-bush, 243.
Delesseria alata, 176.
Deschampsia **arctica**, 143, 144; brachyphylla, 143, 144; brevifolia, 143, 144; caespitosa, 144, var. alpina, 144, var. arctica, 144, var. brevifolia, 144, var. setifolia, 144; curtifolia, 143, 144; setifolia, 144.
Desmodium acuminatum, 89; canadense, 37; canescens, 37; cuspidatum, 37, 90; humifusum, 27; paniculatum, 75; rotundifolium, 75.
Devil's Paint-brush, 62.
Diapensia lapponica, 15.
Diapensiaceae, 15.
Dichelyma capillacea, 182.
Dicranella heteromalla, 30; varia, 30.
Dicranum flagellare, 240; fulvum, 240; fuscescens, 30, 242; longifolium, 30; montanum, 182; scoparium, 30, 240, var. pallidum, 240.
Dictyophora, 134.
Diervilla trifida, 75.
Diospyros virginiana, 16, 19.
Diphyscium foliosum, 30.
Dirca palustris, 132.
Discovery of Comandra livida and Lycopodium sitchense on Mt. Washington, 97.
Distinctive Features of Iris Hookeri, 179.
Distribution of American Cranberries, Variations, and, 231.
Ditrichum tortile, 240; vaginans, 181, 240.
Dogwood, Poison, 106; Round-leaved, 131.
Draba caroliniana, 85; incana, 150.
Driggs, A. W., Notes on the Flora of Connecticut, 36.
Drosera intermedia, 42; rotundifolia, 42.
Drummondia clavellata, 30.
Druopteris, 163.
Dryas octopetala, 98.
Dryopteris, 10, 163, 164, 166; Filix-mas, 164; simulata, 64.
Dwarf Mistletoe, 35, at Bradford, Vermont, 28; Sumach, 130; Tansy, 32.

Early Records of Leontodon in America, 39.
Eastern America, An Osmorrhiza New to, 153; Maine, Algologist's Vacation in, 174; Massachusetts, Crepis virens in, 197, Hemicarpha in, 82, Plants new to, 60.
Eaters of Mushrooms, Certain, 77.
Ebenaceae, 16.
Ebony Spleenwort, 54.
Ectocarpus tomentosus, 118.
Eggleston, W. W., Discovery of Comandra livida and Lycopodium sitchense on Mt. Washington, 97; Stature attained by Euphrasia Oakesii, 108.
Elder, 108; Box, 130.
Eleocharis diandra, 2, at Brunswick, Maine, Occurrence of, 1; palustris, var. vigens, 27.
Ellisia Nyctelea, 170, in Massachusetts, Juncus Torreyi and, 170.
Elusive Character of Pogonia pendula, 2.
Elwell, L. H., Cypripedium arietinum on Mt. Toby, Massachusetts, 62.
Elymus **aristatus**, 147; hirsutiglumis, 27; robustus, 27; triticoides, 147.
Empetrum, 34, 196; in Franklin County, Maine, Occurrence of, 196; in New England, The Chilian, 147; nigrum, 24, 147, 148, 150, 189, 196, var. andinum, 148, 149, 150, 196; purpureum, 148, 149; rubrum, 148, 149.
Enteromorpha, 123, 175; intestinalis, 175.
Entodon repens, 183.
Epipactis Helleborine, 22.
Epiphegus virginiana, 93.
Equisetum hiemale, 55.

Eragrostis campestris, 144; major, 39; nitida, 144; Purshii, 39; reptans, 39.
Ericaceae, 200.
Eriocaulon septangulare, 103.
Eriophorum, 82; polystachyon, 82, var. Vaillantii, 82; virginicum, 82.
Erodium, 248; moschatum, 248, in Connecticut, 248.
Errata, 250.
Erythronium, 127, 128; americanum, 88; Yellow, 128.
Eucladophora, 113, 114, 115, 119.
Eunephrodium, 162.
Eupatorium aromaticum, 76; purpureum, 88.
Euphorbia corollata, 85.
Euphrasia, 108; americana, 26, 189; Oakesii, 108, Stature attained by, 108; Randii, 26.
Eurhynchium strigosum, 240, var. robustum, 183.
Evans, A. W., Notes on New England Hepaticae, 207.
Evergreen Ferns in New England, 49.
Everlastings, 34.
Extension of Range for the Typical Lycopodium complanatum, 154.

Fagopyrum esculentum 203, 206; tataricum, 203, 206.
Fall Dandelion, 39.
False Maiden-hair, 54.
Features of Iris Hookeri, Distinctive, 179.
Fern, An Anomalous, 10; Christmas, 10, 53; Climbing, 51, in New Hampshire, 83.
Fernald, M. L., Anomalous Skullcap, 137; Aster undulatus × Novi-Belgii, 186; Chilian Empetrum in New England, 147; Cotton-grass new to North America, 82; Early Records of Leontodon in America, 39; Osmorrhiza New to Eastern America, 153; Preliminary Lists of New England Plants,— X, Carex, 218; Seneca Snakeroot in Maine, 133; Taraxacum palustre in America, 155; Two Northeastern Veronicas, 191; Variations and Distribution of American Cranberries, 231; Varieties of Glaux in America, 213.
Ferns, Miscellaneous Notes on New England,— III, 7, IV, 49, V, 157; of Franklin County, Maine, Notes on some, 247; of New England, Evergreen, 49.
Festuca ovina, 33; tenella, 39.
Few Plants of the Blue Hills Reservation, A, 74.
Field Book, New Popular, 201; of American Wild Flowers, 201; Meeting of the Vermont Botanical Club, 189.
Fimbriaria tenella, 30.
Fissidens adiantoides, 30; decipiens, 30; incurvus, 181, 182; minutulus, 182; taxifolius, 240.
Flag, Cat-tail, 93.
Flax, 81.
Fleshy Fungi, 171.
Fletcher, E. F., Lonicera sempervirens established in Westford, Massachusetts, 40.
Flora, Destruction of our Native, 200; New Local, 202; Oak Island and its, 87; of Connecticut, Notes on the, 36; of Massachusetts, Some Additions to the, 166; Protection of Our Native, 139.
Floyd, F. G., Cristate Form of Nephrodium marginale, 244; Ranunculus abortivus, var. eucyclus in Hyde Park, Massachusetts, 152.
Fontinalis Cardoti, 182; Lescurii, 182.
Form of Nephrodium marginale, Cristate, 244; of the Bitter Boletus, 187.
Fougère mâle, 158, 162.
Fox Grape, 130.
Franklin County, Maine, Notes on some Ferns of, 247; Occurrence of Empetrum in, 196.
Fraxinus americana, 17; pennsylvanica, 17. var. lanceolata, 17, 19; pubescens, 17; sambucifolia, 17; viridis, 17, 19.
Frost Herbaria at the University of Vermont, Pringle and, 171.
Frullania aeolotis, 242; Asagrayana, 30; eboracensis, 30; riparia, 242.
Fuci, 125.
Funaria hygrometrica, 30.
Fungi, 77, 171.
Further Notes on Solanum rostratum and Hieracium praealtum in Maine, 151; Observations on Nephrodium, Some; Stations for Veronica Chaemaedrys, 152.

Galium Aparine, 195; erectum, 91; Mollugo, 91; trifidum, 26.
Garden Cress, 32.
Gaylussacia resinosa, 14, 131, var. glaucocarpa, 14, 131.
Gemmae of Lycopodium lucidulum, 58.
Gentiana Andrewsii, 93.
Geranium maculatum, 88; Robertianum, 74.

Gerardia quercifolia, 88.
Geum rivale, 76.
Giant Bulrush, 102.
Glaux, 213, 214, 215; in America, Variations of, 213; maritima, 16, 33, 214, 215, var. obtusifolia, 215.
Gleditschia triacanthos, 103; established in Connecticut, 103.
Glyceria elongata, 39, 146.
Gnaphalium sylvaticum, 34.
Golden-rod, Seaside, 89.
Gonatherus, 153.
Goodyera Menziesii, 18; pubescens, 18, 75; repens, 21, var. ophioides, 18, 21; tesselata, 18.
Grape, Fox, 130; Summer, 130.
Grasses, Notes on North American, 142.
Gratiola aurea, 76.
Graves, C. B., Noteworthy Plants of Southeastern Connecticut,— III, 26; Valerianella in New England, 195.
Gray Birch, 132.
Green Spleenwort, 54.
Greylock, Pogonatum capillare on Mt., 83; Region, A List of Bryophytes from the Mt., 29, Bryophytes of the Mt.,— II, 238.
Grimmia apocarpa, 240; maritima, 24.
Grout, A. J., Notes on Vermont Mosses, 180.
Gutterson, M. E., Cuphea procumbens at Andover, Massachusetts, 247.
Gymnomitrium, 208; adustum, 208; concinnatum, 207; coralloides, 207, 208.

Habenaria, 74, 79; blepharoglottis, 18, 74; bracteata, 18; ciliaris, 18, 21; dilatata, 18, 80; fimbriata, 18, 106; Hookeriana, 18, var. oblongifolia, 18, 21; hyperborea, 18, 80, and its Allies, Note upon the Recent Treatment of, 79; lacera, 18, 74; obtusata, 18, 22; orbiculata, 18, 22; psychodes, 18, 74; tridentata, 18, 74; virescens, 18.
Hackberry, 132.
Half-high Blueberry, 131.
Hamamelis virginiana, 96.
Handbook of Trees of New England, 40.
Harger, E. B., Noteworthy Plants of Connecticut, 84.
Harper, R. M., Notes on Lycopodium clavatum and its Variety monostachyon, 100.
Harvey, L. H., Further Notes on Solanum rostratum and Hieracium praealtum in Maine, 151.
Hawkweed, Mouse-ear, 151; Orange, 62, 151.
Hazel, Beaked, 132.
Hazelnut, 132.
Hazen, T. E., Seventh Annual Winter Meeting of the Vermont Botanical Club, 64.
Hedwigia ciliata, 30.
Hedysarum cuspidatum, 90.
Helenium nudiflorum, 198.
Heleochloa juncea, 48.
Helianthemum majus, 91.
Helianthus divaricatus, 88; strumosus, 88.
Heliopsis laevis, 100.
Hemicarpha, 82, in Eastern Massachusetts, 82; subsquarrosa, 82.
Hemlock, 93, 169.
Hemp, 81.
Hepatica, 127, 128.
Hepaticae, 30, 242; Notes on New England, 207.
Hepaticas, Blooming of, 127.
Hepatics, 29.
Hervey, E. W., Rare Plants about New Bedford, 106.
Hieracium, 25, 60, 197; aurantiacum, 62, 151; floribundum, 25; Pilosella, 151; praealtum, 61, 62, 151, 197, at Andover, Massachusetts, 197, in Maine, Further Notes on Solanum rostratum and, 151; vulgatum, 60.
High Cranberry, 131.
Hoary Pea, 249.
Hoffmann, R., Virulence of the Wild Parsnip, 188.
Holbrook, Massachusetts, Utricularia minor in, 42.
Holly, 140, 142.
Holt, G. W., Is Cirsium palustre a Native of New Hampshire, 217.
Homalia Jamesii, 183.
Honeysuckle, Trumpet, 40.
Hop-hornbeam, 93.
Horsenettle, 13.
Horticulture, Cyclopedia of American, 108.
Hottonia inflata, 16, 20, 76, 85.
Houstonia, 75; caerulea, 75; purpurea, var. longifolia, 75.
Huckleberry, 131; Black, 14; Blue-black, 14; Notes on the Blueberried, 14.
Hudsonia ericoides, 61; tomentosa, 34, 61.
Hyde Park, Massachusetts, Ranunculus abortivus, var. eucyclus in, 152.
Hydrocotyle umbellata, 103.
Hylocomium brevirostre, 181; pyrena-

icum, 182; splendens, 30; squarrosum, 181; triquetrum, 30; umbratum, 240.
Hypericum, 135; adpressum, 135, 136, 137, var. **spongiosum**, 136, 137; **Bissellii**, 136, 137; ellipticum, 103.
Hypericums of the Adpressum Group, Two New, 135.
Hypnum, 238; chrysophyllum, 238; cordifolium, 182; crista-castrensis, 30, 181; cupressiforme, 240; curvifolium, 181, 241; dilatatum, 241; eugyrium, 241; fertile, 181; fluitans, var. atlanticum, 181; Haldanianum, 241; hispidulum, 239; imponens, 181; 241; molluscum, 182; ochraceum, 182; pallescens, 181, 241; Patientiae, 181; pratense, 30, 181; reptile, 181, 241; Schreberi, 30; uncinatum, 30, forma plumosa, 182.

Ilea fulvescens, 175.
Ilex verticillata, var. tenuifolia, 92.
Intervale, New Hampshire, Some plants of, 61.
Introduced Species of Crepis and Leontodon, Newly, 249.
Iris, 89; Hookeri, 24, 179, 180, Distinctive Features of, 179; prismatica, 89; versicolor, 24, 179, 180.
Is Cirsium palustre a Native of New Hampshire, 217.
Isoëtes, 2; echinospora, 2.
Iva frutescens, 89, 94.
Ivy Poison, 43.
Ivy-poisoning, 105, and its Treatment, 43.

Jasione montana, 15, 20, 199, in Massachusetts, 199.
Jewell, H. J., Notes on some Ferns of Franklin County, Maine, 247.
Jones, L. R., Field Meeting of the Vermont Botanical Club, 189; Pogonia affinis in Vermont, 216; Pringle and Frost Herbaria at the University of Vermont, 171.
Josselyn Botanical Society of Maine, Announcement, 110; Annual Meeting, 188; Mid winter Meeting, 62.
Juncus, 60, 170; balticus, 33; brachycarpus, 27, 60; canadensis, var. subcaudatus, 99; filiformis, 2; Greenei, 85; nodosus, 60, var. megacephalus, 170; pelocarpus, 129; scirpoides, 60; subtilis, 129; tenuis, var. anthelatus, 27, var. Williamsii, 99; Torreyi, 170, and Ellisia Nyctelea in Massachusetts, 170.
Jungermannia barbata, 30, var. attenuata, 210, var. Floerkii, 210, var. lycopodioides, 210, var. quinquedentata, 210; bicrenata, 209; capitata, 209; excisa, 209, var. crispa, 209; Floerkii, 210; incisa, 242; intermedia, 209; lycopodioides, 210; Lyoni, 210; Mildeana, 212; Naumanni, 210; Novae-Caesareae, 212; quinquedentata, 210, 211; Schraderi, 242; ustulata, 208; ventricosa, 242.
Juniper, 34.
Juniperus communis, var. canadensis, 34, 133; Sabina, var. procumbens, 34, 37; virginiana, 133.

Kalmia glauca, 106, 189; latifolia, 131, 151.
Kantia Sullivantii, 207, 212; Trichomanis, 211.
Kennedy, G. G., Maine Coast at Cutler, 23; Plants new to Eastern Massachusetts, 60.
King-Devil Weed, 151, in the Penobscot Valley, 61.
Knight, O. W., "King-devil Weed" in the Penobscot Valley, 61.
Knotgrass, Bird's, 65.
Knowlton, C. H., Occurrence of Empetrum in Franklin County, Maine, 196.

Labrador Tea, 131.
Lady's Slipper, 94, 95, 106.
Lactuca hirsuta, 37; Morssii, 138; scariola, var. integrata, 92.
Lake St. John, Quebec, Two more Rare Plants from, 128.
Laminaria, 175, 177; digitata, var. typica, 177; longicruris, 177; platymeris, 176; stenophylla, 175.
Lamium, 218; album, 218, in Maine, 218.
Lapsana communis, 92.
Larch, 35.
Large Cranberry, 234.
Larix americana, 106, 189.
Lastraea, 10, 53, 161, 162; dilatata, var. tanacetifolia, 53; Filix mas, 159; patens, 162; tetragona, 162.
Laternea, 135.
Laurel, Mountain, 131, 140, 142, 151.
Lawrence, Massachusetts, Clathrus columnatus in, 134; Volvaria volvacea in, 3.
Leak, 81.
Leavitt, R. G., Notes on Lycopodium,

57; Seed Dispersal of Viola rotundifolia, 183; Notice of work, 85.
Lechea major, 28, in New Hampshire, 28; minor, 130.
Ledum groenlandicum, 131; latifolium, 131.
Lee, L. A., Aquilegia canadensis, var. flaviflora in Maine, 169.
Leersia virginica, 93.
Leguminosae, 13.
Leontodon, 249; autumnalis, 39, 40, 189, 249, var. pratensis, 189; hastilis, 250; in America, Early Records of, 39; Newly Introduced Species of Crepis and, 249; palustris, 157.
Leonurus Cardiaca, 91.
Lepidium sativum, 32.
Lepidozia reptans, 30.
Lepiota americana, 199; cepaestipes, 199; naucina, 199.
Leptobryum pyriforme, 30, 182.
Leptopoda brachypoda, 198.
Leskea nervosa, 182; polycarpa, 239.
Leucobryum vulgare, 30.
Leucodon sciuroides, 30, 31, 183.
Leucophysalis grandiflora, 190.
Lichens, 172.
Ligustrum vulgare, 17, 74.
Lilium canadense, 89; philadelphicum, 89.
Lily, Cow, 93.
Limnanthemum lacunosum, 76.
Limnorchis, 79; dilatata, 80; fragrans, 80, 81; huronensis, 79, 81; hyperborea, 80, 81; major, 79, 81; media, 79, 80, 81.
Limosella aquatica, var. tenuifolia, 33.
Lindera Benzoin, 132.
Lingonris, 232.
Liochlaena lanceolata, 30.
Liparis liliifolia, 18, 20, 21, 74; Loeselii, 19, 62, in Massachusetts, 62.
List of Bryophytes from the Mt. Greylock Region, 29.
Listera auriculata, 19; convallarioides, 19; cordata, 19, 21.
Lists of New England Plants, Preliminary,— VIII, 15; IX, Polygonaceae, 203; X, Carex, 218.
Litorella lacustris, 129.
Liverwort, 81.
Lobelia cardinalis, 15; Dortmanna, 15, 76; inflata, 15; Kalmii, 15; spicata, 15, 75; syphilitica, 15, 20.
Lobeliaceae, 15.
Local Flora, A New, 202.
Lonicera, 40; caerulea, 24; glauca, 131, sempervirens established in Westford, Massachusetts, 40.
Lophanthus, 88; scrophulariaefolius, 89, 94.
Lophocolea heterophylla, 30.
Lophozia barbata, 210, 211; bicrenata, 209; Floerkii, 210, 211; gracilis, 210; lycopodioides, 210, 211, var. Floerkii, 210; Lyoni, 210, 211; Marchica, 211, 212; quinquedentata, 210, 211.
Lousewort, 88.
Lupinus perennis, 76.
Lychnis chalcedonica, 85.
Lycopodium, 55; chamaecyparissus, 59; clavatum, 57, 101, 102, and its Variety monostachyon, Notes on, 100, var. monostachyon, 57, 58, 100, 101, on Mt. Monadnock, 57; complanatum, 57, 59, 154, extension of Range for the Typical, 154, var. chamaecyparissus, 59, 98, var. flabelliforme, 59; lucidulum, 58, Gemmae of, 58; Notes on, 57; obscurum, 57; Selago, 58, 150; sitchense, 98, on Mt. Washington, Discovery of Comandra livida and, 97; tristachyum, 98.
Lycopus virginicus, 91.
Lygodium, 83; palmatum, 36, 51, 64, 83.
Lyngbya aestuarii, 123.
Lysimachia Nummularia, 16; producta, 16, 92, 137; punctata, 16, 62; quadrifolia, 16; stricta, 16; thyrsiflora, 16; vulgaris, 16, 107.
Lythrum Hyssopifolia, 89.

Magnolia glauca, 140.
Maiden-hair, False, 54.
Maine, Algologist's Vacation in Eastern, 174; Aquilegia canadensis, var. flaviflora in, 169; Aulacomnium heterostichum in, 169; Coast at Cutler, 23; Further Notes on Solanum rostratum and Hieracium praealtum in, 151; Josselyn Botanical Society of, Announcement, 110, Annual Meeting, 188, Midwinter Meeting, 62; Lamium album in, 218; New Stations for Peltandra virginica and Conopholis americana in, 168; Notes on some Ferns of Franklin County, 247; Occurrence of Eleocharis diandra at Brunswick, 1; Occurrence of Empetrum in Franklin County, 196; Seneca Snakeroot in, 133.
Mann, R. L. An American Occurrence of the European Centaurea diffusa, 249.
Maple, River, 130; Silver, 130.
Marchantia polymorpha, 30.
Marginal Shield-fern, 51.

Margined Sumach, 130.
Marine Cladophoras of New England, 111.
Marsupella, 208; adusta, 208; emarginata, 208, 209, 242; sphacelata, 208; Sprucei, 208; ustulata, 208.
Massachusetts, Clathrus columnatus in Lawrence, 134; Crepis virens in Eastern, 197; Cuphea procumbens at Andover, 247; Cypripedium arietinum on Mt. Toby, 62; Hemicarpha in Eastern, 82; Hieracium praealtum at Andover, 197; Jasione montana in, 199; Juncus Torreyi and Ellisia Nyctelea in, 170; Liparis Loeselii in, 62; Lonicera sempervirens established in Westford, 40; Plants new to Eastern, 60; Ranunculus abortivus, var. eucyclus in Hyde Park, 152; Rare Plants in Centreville, 245; Some Additions to the Flora of, 166; Some Plants recently found in and around North Easton, 13; Two Noteworthy Carices at Sudbury, 167; Utricularia minor in Holbrook, 42, in Vinnicunnet, 102; Volvaria volvacea in Lawrence, 3.
Mathews, F. S., Notice of work, 201.
Matricaria discoidea, 33, 107, 189; inodora, 189.
Meeting of the Josselyn Botanical Society, Annual, 188, Midwinter, 62; Vermont Botanical Club, Field, 189.
Menispermum canadensis, 129.
Mentha aquatica, 106; canadensis, 34; Cardiaca, 100; piperita, 192; rubra, 34.
Menyanthes trifoliata, 106.
Merrill, E. D., Notes on North American Grasses, 142; Notes on Sporobolus, 45.
Mertensia maritima, 189.
Mesogloia divaricata, 178.
Metcalf, Mrs. R. E., Climbing Fern in New Hampshire, 83.
Metzgeria conjugata, 30.
Microstylis, 75; monophyllos, 19; ophioglossoides, 19, 75.
Midwinter Meeting of the Josselyn Botanical Society of Maine, 62.
Milium, 142, 143; Muhlenbergianum, 142, 143; pungens, 142, 143.
Mint, 34.
Miscellaneous Notes on New England Ferns,— III, 7, IV, 49, V, 157.
Mistletoe, 35; at Bradford, Vermont, The Dwarf, 28; Dwarf, 35.
Mnium affine, 30; cuspidatum, 30; orthorrhynchum, 182; punctatum, 30, var. elatum, 30; serratum, 30; stellare, 30.
Monadnock, Lycopodium clavatum, var. monostachyon on Mt., 57.
Monarda fistulosa, 91; mollis, 89, 91.
Monostroma latissimum, 175; quaternarium, 175.
Montia fontana, 150.
Moonseed, 129.
Morrell, J. M. H., Lamium album in Maine, 218.
Mosses, 29; Notes on Vermont, 180.
Moulton, D. H., Annual Meeting of the Josselyn Society, 188; Josselyn Botanical Society of Maine, Announcement, 110; Midwinter Meeting, 62.
Mount Greylock, Pogonatum capillare on, 83.
Mount Greylock Region, Bryophytes of the,— II, 238; List of Bryophytes from the, 29.
Mount Monadnock, Lycopodium clavatum, var. monostachyon on, 57.
Mount Toby, Massachusetts, Cypripedium arietinum on, 62.
Mount Washington, Discovery of Comandra livida and Lycopodium sitchense on, 87.
Mountain Cranberry, 231, 232; Laurel, 131, 140, 142, 151; Pink, 131; Spleenwort, 54.
Mouse-ear Hawkweed, 151.
Muhlenbergia aspericaulis, 46; capillaris, 143; dumosa, 46; expansa, 143; trichopodes, 143.
Musci, 30, 238.
Mushroom for the market, A New, 199.
Mushrooms, Certain eaters of, 77.
Mutinus caninus, 134.
Myosotis arvensis, 91.
Myriophyllum, 105; ambiguum, 105, var. limosum, 105.
Narcissus poeticus, 84.
Nardia adusta, 208; haematosticta, 209; hyalina, 209.
Native Flora, Destruction of our, 200; Protection of our, 139.
Neckera pennata, 30.
Necklace Poplar, 133.
Nephrodium, 9, 10, 158–166; acrostichoides, 159, 162; Boottii, 10, 52; Clintonianum, 10–12; cristatum, 10, 52, 53, 165, var. Clintonianum, 52, var. Slossonae, 52, × marginale, 10, 11, 51; dilatatum, 53; Filix-mas, 158, 159, 162, 163, 165; fragrans, 10; Goldieanum, 10, 52; marginale, 9–12, 51, 165, 245, Cristate form of, 244, forma Davenportii, 245; molle, 161; noveboracense, 10, 165; simulatum, 10, 84;

Some Further observations on, 158; spinulosum, 9, 10, 12, 53, var. dilatatum, 53, var. intermedium, 53; Thelypteris, 10; unitum, 161.
New Bedford, Rare Plants about, 106.
New England Aspidieae, 7; Chilian Empetrum in, 147; Evergreen Ferns of, 49; Ferns, Miscellaneous Notes on, III, 7, IV, 49, V, 157; Handbook of the Trees of, 40; Hepaticae, Notes on, 207; Marine Cladophoras of, 111; Plants, Preliminary lists of, VIII, 15, IX, Polygonaceae, 203, X, Carex, 218; Polygonums of the Section Avicularia, 65; Rediscovery of Phaseolus perennis in, 13; Valerianella in, 195; Veronica Chamaedrys in, 107.
New Hampshire, Calluna vulgaris in Southern, 200; Climbing Fern in, 83; Is Cirsium palustre a Native of, 217; Lechea major in, 28; Plants in the Middle Connecticut Valley, Some Vermont and,— I, 129; Some Plants of Intervale, 61.
New Hypericums of the Adpressum group, Two, 135; Jersey Tea, 130; Local Flora, 202; Mushroom for the Market, 199; Popular Field Book, 201; Station for Polypodium vulgare, var. cambricum, 197; Stations for Peltandra virginica and Conopholis americana in Maine, 168.
Newly Introduced Species of Crepis and Leontodon, 249.
North America, Cotton-grass new to, 82.
North American Grassés, Notes on, 142.
North Easton, Massachusetts, Some Plants found in and around, 13.
Northeastern Veronicas, Two, 191.
Norton, A. H., New Stations for Peltandra virginica and Conopholis americana in Maine, 168.
Norway Pine, 133.
Notable Plant Stations in Rhode Island, Some, 198.
Note upon Recent Treatment of Habenaria hyperborea and its Allies, 79.
Notes on Lycopodium, 57; Lycopodium clavatum and its Variety monostachyon, 100; New England Ferns, Miscellaneous, III, IV, V, 7, 49, 157; New England Hepaticae, 207; North American Grasses, 142; Solanum rostratum and Hieracium praealtum in, Maine, Further, 151; Some Ferns of Franklin County, Maine, 247; Sporobolus, 45; the Blue-berried Huckleberry, 14; the Flora of Connecticut, 36; Vermont Mosses, 180.
Noteworthy Carices at Sudbury, Massachusetts, Two, 167; Plants of Connecticut, 84, 98; Plants of Southeastern Connecticut,— III, 26.
Nye, H. A., Blooming of Hepaticas, 127.
Nymphaea odorata, var. minor, 76, 103; reniformis, 27; tuberosa, 27.
Nyssa sylvatica, 91, 131.
Oak, 93; Black, 132; Island and its Flora, 87; Scrub Black, 133; White, 132; Yellow, 132.
Observations on Nephrodium, Some Further, 158.
Occurrence of Eleocharis diandra at Brunswick, Maine, 1; of Empetrum in Franklin County, Maine, 196; of the European Centaurea diffusa, American, 249.
Odontoschisma denudatum, 211.
Oleaceae, 17.
Onion, 81.
Onoclea sensibilis, 157, forma obtusilobata, 36; Struthiopteris, 157.
Orange Hawkweed, 62, 151.
Orchidaceae, 18.
Orchis rotundifolia, 19, 21, 22; spectabilis, 19, 22, 93.
Orthotrichum sordidum, 181; strangulatum, 30.
Oryzopsis canadensis, 142, 143; juncea, 142, 143; parviflora, 142, 143.
Osmorrhiza, 88, 153, 154; brevistylis, 153; longistylis, 81, 153; New to Eastern America, 153; **obtusa**, 154.
Osmunda, 83; regalis, 83.
Our Chokeberries, 55.
Outlines of Botany, 85.
Oxyria digyna, 203.
Paint-brush, Devil's, 62.
Panicularia borealis, 146; **Davyi**, 145; fluitans, 146; **Torreyana**, 146.
Panicum boreale, 89; dichotomum, 38; firmum, 142, 143; lanuginosum, 38, 90; longifolium, 38; macrocarpon, 38, 89; microcarpon, 39; sphaerocarpon, 39; stipitatum, 26; unciphyllum, 38, 90.
Paronychia argyrocoma, 61.
Parsnip, 188; Virulence of the Wild, 188.
Paspalum Muhlenbergii, 26.
Pastinaca sativa, 188.
Pea, Hoary, 249.
Pease, A. S., Hieracium praealtum at Andover, Massachusetts, 197; Two new Stations for Arceuthobium, 249.
Pedicularis canadensis, 88, 93.
Pellaea atropurpurea, 54.

Peltandra, 169; virginica, 106, 168, and Conopholis americana in Maine, New Stations for, 168.
Penobscot Valley, "King-devil Weed" in, 61.
Peppergrass, 32.
Pepperidge, 131.
Peridermium abietinum, 35.
Persistence of the Button-bush, Remarkable, 243.
Petasites palmata, 128.
Pfaff, F., Ivy Poisoning and its Treatment, 43.
Phaseolus, 13; perennis, 13, 99, in New England, Rediscovery of, 13
Philonotis fontana, 30.
Phleum alpinum, 150.
Phragmites, 93; communis, 93.
Phryma Leptostachya, 90.
Physcomitrium turbinatum, 30.
Physostegia virginiana, 190.
Picea alba, 24, 189; rubra, 28.
Pignut, 132.
Pine, 74; Norway, 133; White, 93.
Pink, Mountain, 131; Swamp, 131.
Pink-spored Agarics, 6.
Pinus resinosa, 133.
Plagiothecium denticulatum, 30, 241; Muellerianum, 182; silvaticum, 241; turfaceum, 30, 182, 241.
Plant Stations in Rhode Island, Some Notable, 198.
Plantago borealis, 24, 25; decipiens, 25, 89; maritima, 25.
Plants about New Bedford, Rare, 106; from Lake St. John, Quebec, Two more Rare, 128; from Prince Edward Island, Some, 31; in Centreville, Massachusetts, Rare, 245; in the Middle Connecticut Valley, Some Vermont and New Hampshire,—I, 129; mentioned in Young's Chronicles, Concerning the, 81; New to Eastern Massachusetts, 60; of Connecticut, noteworthy, 84, 98; of Intervale, New Hampshire, Some, 61; of Southeastern Connecticut, Noteworthy,—III, 26; of the Blue Hills Reservation, A few, 74; Preliminary Lists of New England,—VIII, 15, IX, Polygonaceae, 203, X, Carex, 218; recently found in and around North Easton, Massachusetts, Some, 13.
Platanthera convallariaefolia, 79; dilatata, 79; hyperborea, 79; leucostachys, 79.
Platanus occidentalis, 132.
Plectonema Battersii, 177.
Pleocnemia, 162.
Plum, 81.
Plumaria elegans, 176.
Plumbaginaceae, 16.
Poa, 25; alpina, 25; **ampla**, 145; arachnifera, var. glabrata, 144; autumnalis, 145; brachyphylla, 145; brevifolia, 145; cuspidata, 145; debilis, 39; elongata, 146; glumaris, 33; Leckenbyi, 145; nevadensis, 145; nitida, 144; pratensis, 25, var. domestica, 25; pungens, 145; Torreyana, 146.
Pogonatum alpinum, 30, 31; capillare, 83, 240, 241, on Mt. Greylock, 83; urnigerum, 30, 31.
Pogonia affinis, 19, 22, 216, in Vermont, 216; ophioglossoides, 19, 42; pendula, 2, 19, 21, 22, 61, Elusive character of, 2; verticillata, 19, 74, 217.
Poison Ivy, 43; Sumach, 43, 130.
Poisoning and its Treatment, Ivy, 43; by Cypripedium spectabile in Vermont, Some Cases of, 94.
Polygala Nuttallii, 85; paucifolia, 74, 76; polygama, 74, 75, 249; Senega, 133.
Polygonaceae, 203.
Polygonella articulata, 61, 204.
Polygonum, 65; acre, 204, var. leptostachyum, 204; amphibium, 104, 105, 204, Biological Relations of Polygonum Hartwrightii to, 104, var. **Hartwrightii**, 105, 204; arenarium, 66, 70, 205; arifolium, 204; aviculare, 65, 66, 69, 72, 73, 204, 205, var. angustissimum, 70, 73, var. erectum, 71, var. laxum, 70, var. littorale, 69, 73, 91, 204, 205, var. neglectum, 70, var. vegetum, 70, 73; Bellardi, 69, 72, 73, 205; camporum; 72; Careyi, 204; cilinode, 204; Convolvulus, 204; cuspidatum, 204, 205; Douglasii, 73, 204, 205; dumetorum, 204; erectum, 71, 72, 73, 204; exsertum, 68, 73, 204; **Fowleri**, 67, 68, 73, 204; glaucum, 67; Hartwrightii, 104, 105, to Polygonum amphibium, Biological Relation of, 104; Hydropiper, 204; hydropiperoides, 204, var. strigosum, 204; lapathifolium, 204, var. incanum, 204; littorale, 70; marinum, var. roseum, 67; maritimum, 66, 67, 68, 73, 91, 204, var. littorale, 70; Muhlenbergii, 204; neglectum, 70; orientale, 204, 205; pennsylvanicum, 204; Persicaria, 204; **prolificum**, 68, 69, 72, 73, 91, 204; Raii, 33, 67, 88; ramosissimum, 69, 71, 73, 204, forma **atlanticum**, 72, 204, var. prolificum, 68; Rayi, 67, 68; Roberti, 67, 68, 73;

rurivagum, 69; sagittatum, 204; scandens, 204; tenue, 73, 204; virginianum, 199, 204; viviparum, 204.
Polygonums of the Section Avicularia, New England, 65.
Polypodium, 165, 247; vulgare, 51, 245, var. auritum, 247, var. cambricum, 51, 197, 247, New station for, 197.
Polypody, Common, 51.
Polysiphonia Olneyi, 178; violacea, 177.
Polystichum, 8, 9, 54, 159, 162–164; acrostichoides, 10, 53; aculeatum, var. **Braunii**, 10, 54; Lonchitis, 8.
Polytrichum commune, 30; juniperinum, 30; ohioense, 30; piliferum, 30.
Pontederia cordata, 168.
Poplar, Necklace, 133.
Populus deltoides, 133.
Porella platyphylla, 30.
Porotrichum alleghaniense, 183.
Porphyra amplissima, 177; miniata, 177.
Potentilla Anserina, 33, 89; canadensis, 91; palustris, 189; tridentata, 38.
Preisselbeere, 232.
Preissia commutata, 30.
Preliminary Lists of New England Plants, —VIII, 15, IX, Polygonaceae, 203, X, Carex, 218.
Prenanthes, 89; alba, 89; trifoliolata, 37, 89, 92.
Prickly Ash, 130.
Primula farinosa, 16, 150; mistassinica, 16.
Primulaceae, 16, 213.
Prince, F. C., Some Plants of Intervale, New Hampshire, 61.
Prince Edward Island, Some Plants from, 31.
Pringle and Frost Herbaria at the University of Vermont, 171.
Protection against Rhus-poisoning, Saleratus as a, 105; of our Native Flora, 139.
Prunus pumila, 130.
Ptilidium ciliare, 30.
Puccinellia angustata, 27.
Purple Cliff-Brake, 54.
Pycnanthemum linifolium, 75.
Pylaisia intricata, 30; velutina, 183.
Pyrus arbutifolia, 55, 56, 131, var. erythrocarpa, 91, var. melanocarpa, 38, 91.

Quebec, Two more Rare Plants from Lake St. John, 128.
Quercus acuminata, 167; alba, 132; ilicifolia, 38, 133; Muhlenbergii, 190; prinoides, 133; velutina, 132.

Racomitrium aciculare, 30, 31; Sudeticum, 241.
Radula complanata, 242; obconica, 207, 213.
Ragwort, Tansy, 34.
Rand, E. L., Hemicarpha in Eastern Massachusetts, 82; Staminate Plant of Antennaria Parlinii, 152.
Range for the Typical Lycopodium complanatum, Extension of, 154.
Ranunculus, 105; abortivus, 88, var. eucyclus, 152, in Hyde Park, Massachusetts, 152; acris, 32, var. Steveni, 32; allegheniensis, 88, 92; aquatilis, var. tricophyllus, 76; Cymbalaria, 33; Flammula, var. reptans, 129; multifidus, 105, var. terrestris, 105; recurvatus, 76, 88; repens, 92.
Raphidostegium recurvans, 241.
Rare Plants about New Bedford, 106; from Lake St. John, Quebec, Two more, 128; in Centreville, Massachusetts, 245.
Recent Treatment of Habenaria hyperborea and its American Allies, Note upon, 79.
Records of Leontodon in America, Early, 39.
Red Cedar, 133; Chokeberry, 55, 131.
Rediscovery of Phaseolus perennis in New England, 13.
Reed, Sea-sand, 33.
Relation of Polygonum Hartwrightii to P. amphibum, Biological, 104.
Remarkable Persistence of the Button-bush, 243.
Remarks on Volvaria, 5.
Reservation, A Few Plants of the Blue Hills, 74.
Rhinanthus Crista-galli, 108.
Rhode Island, Some Notable Plant Stations in, 198.
Rhododendron, 141; canescens, 100, 131; nudiflorum, 100.
Rhodophyllis dichotoma, 176.
Rhus, 97; copallina, 130; glabra, 130; Toxicodendron, 43, 95; venenata, 43, 95, 105, 130.
Rhus-poisoning, Saleratus as a Protection against, 105.
Rhynchostegium rusciforme, 241; serratulum, 183.
Riccia crystallina, 207.
Rich, W. P., Juncus Torreyi and Ellisia Nyctelea in Massachusetts, 170; Oak Island and its Flora, 87; Preliminary Lists of New England Plants.— IX, Polygonaceae, 203.

River Maple, 130; Rose, 130.
Robinia hispida, 198.
Robinson, B. L., Further Stations for Veronica Chamaedrys, 152; Lechea major in New Hampshire, 28; New England Polygonums of the Section Avicularia, 65; Protection of Our Native Flora, 139; Two New Hypericums of the Adpressum Group, 135; Veronica Chamaedrys in New England, 107.
Robinson, J., Concerning the Plants mentioned in Young's Chronicles, 81.
Rock Cranberry, 231.
Rosa blanda, 130; carolina, 131; lucida, 189, var., 34.
Rose, River, 130; Smooth, 130; Swamp, 131.
Round-leaved Dogwood, 131.
Rubus, 64, 97; argutus, 91; Chamaemorus, 97, 189; nigrobaccus, 91; sp., 91.
Rumex Acetosa, 204; Acetosella, 204; altissimus, 204; Brittanica, 204; conglomeratus, 205; crispus, 204; hastatulus, 204, 205; maritimus, 205; obtusifolius, 204; Patientia, 204; persicarioides, 205; salicifolius, 205; sanguineus, 205; verticillatus, 205.

Sabbatia chloroides, 103, 107; stellaris, 107.
Sagenia, 162.
Sagina nodosa, 24, var. pubescens, 24, 26; procumbens, 150.
Sagittaria, 2, 168; rigida, 39.
St. John, Quebec, Two more Rare Plants from Lake, 128.
Saleratus as a Protection against Rhus-poisoning, 105.
Salix longifolia, 99.
Salsola Kali, 33.
Samolus Valerandi, var. americanus, 16.
Sand Cherry, 130.
Sandford, S. N. F., Cut-leaved Cherry Birch, 83.
Sanicula gregaria, 89, 91; marylandica, 88.
Santalaceae, 18.
Sarcoscyphus adustus, 208; Ehrharti; pigmaeus, 208; Sprucei, 208; ustulatus, 208.
Sargent, C. S., Some Additions to the Flora of Massachusetts, 166.
Sarracenia purpurea, 106.
Sassafras officinale, 132.
Scabiosa australis, 106, 107.
Scapania, 212; curta, 212, 213; nemorosa, 242; undulata, 30, 31, var purpurea, 31.
Scheuchzeria palustris, 189.
Schistostega, 182; osmundacea, 182.
Scirpus lacustris, 102; pungens, 33.
Scorgie, A. M., Jasione montana in Massachusetts, 199.
Scrophularia marylandica, 89, 94.
Scrub Black Oak, 133.
Scutellaria, 137; **Churchilliana**, 138; galericulata, 137, 138; lateriflora, 137, 138.
Sea Sand Reed, 33.
Seaside Golden-rod, 89.
Section Avicularia, New England Polygonums of the, 65.
Sedum acre, 199; Rhodiola, 189.
Seed Dispersal of Viola rotundifolia, 183.
Seed-throwing of Viola, 230.
Selaginella, 55.
Seneca Snakeroot in Maine, 133.
Senecio Jacobaea, 34; Robbinsii, 189; sylvaticus, 34.
Seventh Annual Winter Meeting of the Vermont Botanical Club, 64.
Shagbark, 132.
Shaw, E. L., Carex aurea in Connecticut, 168; New Station for Polypodium vulgare, var. cambricum, 197.
Sheldon, J. L., Notes on the Blue-berried Huckleberry, 14.
Shield-fern, Marginal, 51.
Sibbaldia, 98.
Silene Armeria. 85.
Silsbee, F. H., Volvaria volvacea in Lawrence, Massachusetts, 3.
Silver Maple, 130.
Sisyrinchium angustifolium, 91; Bermudiana, 91.
Skullcap, An Anomalous, 137.
Small Cranberry, 235.
Smilacina stellata, 34, 76.
Smith, A. M., Pogonatum capillare on Mt. Greylock, 83.
Smooth Rose, 130; Sumach, 130.
Snakeroot, 88; in Maine, Seneca, 133.
Snowflake, 218.
Society, Annual Meeting of the Josselyn Botanical. 62, 110, 188; for the Protection of Native Plants. 139.
Solanum, 13; carolinense, 13; Dulcamara, 91; Lycopersicum, 28; rostratum, 14, 151, and Hieracium praealtum in Maine, Further Notes on, 151.
Solidago, 89; altissima, 92; arguta, 89; asperula, 89, 92; canadensis, var. procera, 92; Elliottii, 38; sempervirens, 89, 92; sp., 92; uliginosa, 38.

Some Additions to the Flora of Massachusetts, 166; Cases of Poisoning by Cypripedium spectable in Vermont, 94; further Observations on Nephrodium, 158; Notable Plant Stations in Rhode Island, 198; Noteworthy Plants of Connecticut, 98; Plants from Prince Edward Island, 31; Plants of Intervale, New Hampshire, 61; Plants recently found in and around North Easton, Massachusetts, 13; Vermont and New Hampshire Plants in the Middle Connecticut Valley,— I, 129.
Sonchus asper, 92.
Sorrel, 81.
Southeastern Connecticut, Noteworthy Plants of,— III, 26.
Southern New Hampshire, Calluna vulgaris in, 200.
Spartina caespitosa, 27; juncea, 27.
Species of Crepis and Leontodon Newly Introduced, 249.
Specularia perfoliata, 15.
Speedwell, 107.
Spergularia borealis, 33.
Sphagnum, 42, 74, 75, 212, 238; acutifolium, 30, 242; cuspidatum, 241; cymbifolium, 30; intermedium, 242; medium, 242; recurvum, 242; rigidum, 242; squarrosum, 30; tenerum, 242.
Spice-bush, 132.
Spiraea japonica, 28; prunifolia, 28.
Spiranthes cernua, 19, 76; gracilis, 19; latifolia, 19; praecox, 19, 20; Romanzoffiana, 19, 22; simplex, 19.
Spleenwort, Ebony, 54; Green, 54; Mountain, 54.
Spongomorpha, 113–115, 119; Hystrix, 116, 117; Sonderi, 116, 117; spinescens, 117.
Sporobolus aristatus, 48; aspericaulis, 46; brevifolius, 46, 47, 49; cuspidatus, 47; depauperatus, 45, 46, var. filiformis, 46; ejuncidus, 48, 49; filiformis, 47, 48; **gracilis**, 48, 49; gracillimus, 47; junceus, 48, 49; Notes on, 45; **Richardsonii**, 45–47; simplex, 47, 48, var. **thermale**, 48.
Spruce, 93; Black, 35; White, 35.
Stachys palustris, 85, 103.
Staminate Plant of Antennaria Parlinii, 152.
Staphylea trifolia, 130, 190.
Statice Limonium, var. caroliniana, 16.
Station for Polypodium vulgare, var. cambricum, New, 197.
Stations for Arceuthobium, Two New, 249; for Peltandra virginica and Conopholis americana in Maine, New, 168; for Veronica Chamaedrys, Further, 152.
Stature attained by Euphrasia Oakesii, 108.
Steironema ciliatum, 16, 88; lanceolatum, 16.
Stinking Willie, 34.
Stipa canadensis, 142, 143; expansa, 143; juncea, 142, 143.
Strawberry, 81, 128.
Suaeda, 33.
Subularia aquatica, 129.
Sudbury, Massachusetts, Two Noteworthy Carices at, 167.
Sumach, Dwarf, 130; Margined, 130; Poison, 43, 130; Smooth, 130.
Summer Grape, 130.
Swamp Pink, 131; Rose, 131.
Sweet Coltsfoot, 128; Fern, 40.
Symphoricarpos vulgaris, 106.
Symphytum asperrimum, 84.
Syringa vulgaris, 17, 20.

Tanacetum vulgare, 92.
Tansy, 32; Dwarf, 32; Ragwort, 34.
Taraxacum Dens-leonis, 155; erythrospermum, 92, 155–157; officinale, 155–157, var. palustre, 155, 157; palustre, 155–157, in America, 155.
Tea, Labrador, 131; New Jersey, 130.
Tectaria, 164.
Tetraphis pellucida, 30.
Tetraspora, 175.
Teucrium canadense, 89.
Thelia asprella, 182.
Thuidium delicatulum, 30; microphyllum, 181; paludosum, 182; scitum, 242.
Thuya occidentalis, 37.
Tillaea, 35; aquatica, 35; simplex, 35, 36; Vaillantii, 35, 36.
Tipularia discolor, 19, 21, 22.
Toadstools, 78.
Toxicodendric acid, 43.
Toxicodendrol, 43, 44.
Trailing Arbutus, 140.
Treatment of Habenaria hyperborea and its Allies, Note upon Recent, 79.
Trees of New England, Handbook of the, 40.
Trichochloa expansa, 143.
Trichocolea tomentella, 243.
Tricholoma, 77; personatum, 199; portentosum, 77.
Trientalis americana, 16.
Triglochin maritima, 89.

Trillium, 128; erythrocarpum, 106; grandiflorum, 198.
Triosteum aurantiacum, 88, 92; perfoliatum, 75, 92, 195.
Trisetum subspicatum, 150.
Trumpet Honeysuckle, 40.
Two more Rare Plants from Lake St. John, Quebec, 128; New Hypericums of the Adpressum Group, 135; New Stations for Arceuthobium, 249; Northeastern Veronicas, 191; Noteworthy Carices at Sudbury, Massachusetts, 167.
Typical Lycopodium complanatum, Extension of Range for the, 154.
Tyttebaer, 232.

Ulota crispa, 30; crispula, 30; Hutchinsiae, 30; Ludwigii, 30; phyllantha, 24.
University of Vermont, Pringle and Frost Herbaria at, 171.
Urachne brevicaudata, 142, 143; canadensis, 142.
Utricularia, 42, 102, 103; biflora, 27; cornuta, 76, 102; inflata, 76, 102; minor, 2, 42, 102, 103, in Holbrook, Massachusetts, 42, in Vinnicunnet, Massachusetts, 102; purpurea, 76, 102; resupinata, 27; vulgaris, 76, 102.
Uvularia perfoliata, 88; sessilifolia, 88.

Vacation in Eastern Maine, Algologist's 174.
Vaccinium, 14, 232; buxifolium, 233, 234; macrocarpon, 42, 234–237; Oxycoccus, 106, 235–237, var. intermedium, 236, 237; stamineum, 246; vacillans, 131; Vitis-Idaea, 34, 189, 232–234, 237; American Variety of, 231, var., 233, 234, var. major, 233, 237, var. microphyllum, 234, var. minor, 233, 234, 237, var. pumilum, 234.
Valerianella, 195, 196; in New England, 195; radiata, 195, 196, var. leiocarpa, 196.
Variations and Distribution of American Cranberries, 231; of Glaux in America, 213.
Veratrum viride, 74, 76.
Verbena, 246; hastata, 93, 246, forma **rosea**, 245.
Vermont, Anagallis arvensis and caerulea in, 185; and New Hampshire Plants in the Middle Connecticut Valley, Some,—I, 129; Bird Club, 138; Botanical Club, 138, Field Meeting of, 189, Seventh Annual Winter Meeting of, 64; Dwarf Mistletoe at Bradford, 28; Mosses, Notes on, 180; Pogonia affinis in, 216; Pringle and Frost Herbaria at the University of, 171; some Cases of Poisoning by Cypripedum spectabile in, 94.
Veronica, 108, 192, 193; alpina, 194; americana, 192, 193; Anagallis, 192; Beccabunga, 81, 191–193; Chamaedrys, 107, 108, 152, Further Stations for, 152, in New England, 107; humifusa, 194; intermedia, 192; serpyllifolia, 193, 194, var. alpina, 194, var. borealis, 194, var. humifusa, 194, 195.
Veronicas, Two Northeastern, 191.
Viburnum, 89, 108; dentatum, 89; Opulus, 131; pubescens, 190.
Vilfa, 49; cuspidata, 47; depauperata, 45, 46, var. filiformis, 47, 48; gracilis, 47–49; gracillima, 47; juncea, 49; Richardsonis, 46; squarrosa, 45, 46; subsetacea, 48, 49.
Vinca minor, 17.
Vincetoxicum nigrum, 17, 84.
Vinnicunnet, Massachusetts, Utricularia minor in, 102.
Viola, 64; alpestris, 230; canina, 183; ovata, 39; pubescens, 76, 88; rotundifolia, 183, 184, 230, Seed Dispersal of, 183; Seed-throwing of, 230.
Violet, 230; White, 128; Yellow, 88.
Virginia Creeper, 141.
Virulence of the Wild Parsnip, 188.
Vitis aestivalis, 92; bicolor, 130; Labrusca, 130.
Vitis-Idaea Vitis-Idaea, 234.
Volvaria, 3, 5–7; bombycina, 6; Loveiana, 7; Remarks on, 5; speciosa, 6, volvacea, 4, 5, 7, in Lawrence, Massachusetts, 3.

Walking Leaf, 55.
Washingtonia, 153; obtusa, 153, 154.
Water Cress, 81, 191.
Webera elongata, 30; nutans, 30.
Webster, H., Certain Eaters of Mushrooms, 77; Clathrus columnatus in Lawrence, Massachusetts, 134; Form of the Bitter Boletus, 187; New Mushroom for the Market, 199; Remarks on Volvaria, 5.
Webster, J. R., Crepis virens in Eastern Massachusetts, 197.
Weed, in the Penobscot Valley, "King; Devil," 61; King Devil, 151.
Westford, Massachusetts, Lonicera sempervirens established in, 40.

Missouri Botanical Garden Library
3 1753 00341 3256

White Birch, 83; Oak, 132; Pine, 93 Spruce, 35; Violet, 128.
Wickopy, 152.
Wild Parsnip, Virulence of the, 188.
Williams, E. F., Preliminary Lists of New England Plants,— VIII, 15; Two Noteworthy Carices at Sudbury, Massachusetts, 167.
Winter Meeting of the Vermont Botanical Club, Seventh Annual, 64.
Witches' Brooms, 249, 250.
Woodsia ilvensis, 247; obtusa, 157.
Woodwardia angustifolia, 36.

Xanthoxylum americanum, 130.
Xyris, 76; caroliniana, 76.

Yarrow, 81.
Yellow Erythronium, 128; Oak, 132; Violet, 88.
Young's Chronicles, Concerning the Plants mentioned in, 81.

Zizia aurea, var. obtusifolia, 37.

Fig. 1, *Vaccinium Vitis-Idaea*; fig. 2, *V. Vitis-Idaea*, var. *minor*; fig. 3, *V. Oxycoccus*; fig. 4, *V. Oxycoccus*, var. *intermedium*; fig. 5, *V. macrocarpon*.